

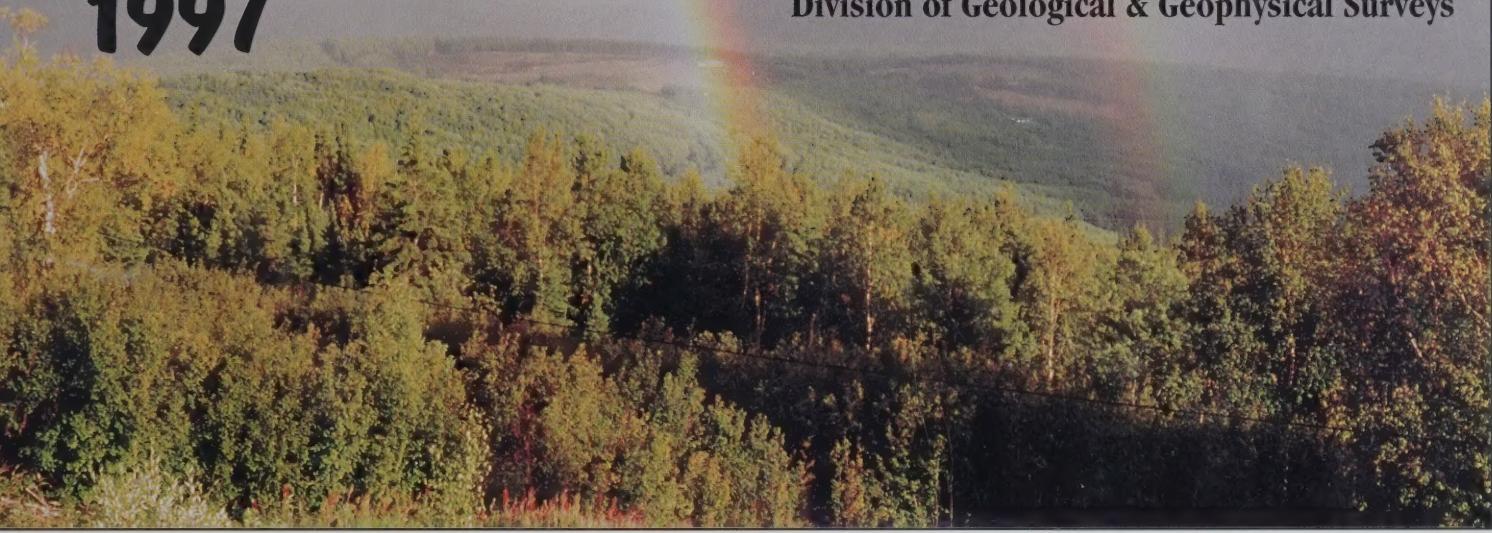
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Alaska's Mineral Industry 1997

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SPECIAL REPORT 52
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OCT 20 1998



FRONT COVER

Top: *Ryan Lode Mine gold recovery plant and heap leach pads bask in late evening rainbow. Photo by Dick Swainbank.*

Bottom: *Dr. Rainer Newberry investigates a silver prospect in the Chulitna mining district during a DGGS mapping project in July 1997, to follow up recently-flown geophysical surveys. Denali is in the background. Photo by K.H. Clautice.*

BACK COVER

Left: *Dr. Moira Smith of Teck Corporation examines outcrop of Ledge Prospect at the Pogo property northeast of Delta Junction. Photo courtesy of Teck Corporation.*

Top right: *Steve McGroarty (left) and Jim Vohden (right) of the Alaska Division of Mining & Water Management, and Bronwen Wang of the U.S. Geological Survey collect water samples at a spring containing iron-rich filamentous algae on the North Fork of the Forty Mile River. This is part of a multi-year cooperative baseline study of the Forty Mile drainage system. Photo by Mitch Henning.*

Bottom right: *Todd Brobst marks ore zone on face in the Greens Creek Mine on Admiralty Island west of Juneau, Alaska. Photo by Jan Nauman.*

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Alaska's Mineral Industry

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R.C. Swainbank



K.H. Clautice



J.L. Nauman

Alaska Department of Natural Resources
Division of Geological & Geophysical Surveys

SPECIAL REPORT 52



“Changes for the better” and “resurgence” are probably the best phrases that apply to Alaska’s mining industry in 1997. Without question, Alaska is experiencing a world-class boom in mining that has attracted attention across the globe. In response, Alaska is open and ready for business and working to expedite the permit process. The Knowles–Ulmer administration is committed to working in partnership with the mining industry to do development right, which means protecting Alaska’s air, water, and fish and wildlife habitat. Many factors account for the resurgence in Alaska’s mineral industry including world-class quantities of minerals in vast unexplored areas strategically located in the global marketplace. These factors, coupled with mining innovations that make developments more cost effective and aggressive marketing of Alaska’s enormous reserves, spell a bright future and prominent role for mining in Alaska’s economy.

Governor Tony Knowles

1997 was another productive and exciting year for mining in Alaska. For the second consecutive year the total value of Alaska’s mineral industry topped \$1 billion. Two new hardrock gold mines were commissioned in 1997—at Illinois Creek and at Fort Knox—and hardrock gold production exceeded that from placer mining for the first time in over 50 years. Greens Creek Mine reached full production in 1997, and the giant Red Dog Mine will soon increase production thanks to assistance from the Alaska Industrial Development and Export Authority. The year demonstrated continued optimism about Alaska’s potential as a good place to do business. Strong exploration expenditure rates, which have led to permitting mines such as the Kensington, exciting new discoveries like Pogo, and doubling of the resource base at Pebble Copper and Donlin Creek, demonstrate Alaska’s bright future for mineral development. (Photo shows Commissioner Debby Sedwick holding one of the first gold bars poured at the Fort Knox Mine near Fairbanks, December 20, 1996. The mine produces about 1,000 ounces per day and employs 250 local workers.)

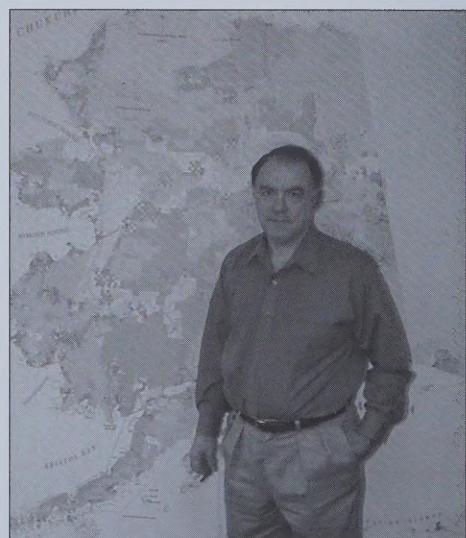
*Deborah B. Sedwick
Commissioner, Department of Commerce & Economic Development*



Despite falling metal prices and market scandals, there were a record number of mining locations established in 1997 in Alaska, many by junior companies whose existence depends on the ability to raise money on the stock markets. It is encouraging that the political climate and incentives in Alaska continue to attract the exploration investment necessary for the future well-being of the mining industry.

The administration recognizes that exploration and future production are vital, and that all aspects of the mining industry are important in Alaska, especially in rural areas where mineral development provides well-paid jobs. Much of Alaska is underexplored, but by acting as a partner to industry, providing data and assistance, the State looks forward to a bright future for the industry.

*John T. Shively
Commissioner, Department of Natural Resources*



EXECUTIVE SUMMARY

In 1997 the total investment in exploration and development in Alaska, together with the value of mineral production, was \$1.162 billion, up almost 13 percent from the \$1.03 billion the previous year. Exploration investment of \$57.8 million was up 30 percent from 1996, production of \$936.2 million was up 59 percent; these increases more than offset the 57 percent decline in development expenditure from \$394 million in 1996 to \$168.4 million in 1997.

Exploration was widespread throughout the state, and highlights include the addition of new reserves at the Red Dog Mine near Kotzebue, doubling of the resource at Pebble Copper near Iliamna and at Donlin Creek near Iditarod, identification of a 4.5-million-ounce high-grade gold resource at Pogo near Delta, and many exciting prospects throughout interior and southeastern Alaska.

Development projects included work on the mine and port at Red Dog, on the pit and leach-pad at Illinois Creek south of Galena, on the tanks and tailings dam at Fort Knox, and permitting at the Kensington Mine near Juneau, which is now fully permitted.

Zinc production from Greens Creek and Red Dog accounted for 53 percent of all commodity value, followed by gold (22 percent), silver (8 percent), sand and gravel (6 percent), lead (5 percent), coal (4 percent), and rock, copper, peat, and jade. For the first time in over 50 years the amount of gold derived from hardrock mines (481,439 ounces) exceeded the 109,077 ounces derived from placer mines.

Alaska's Mineral Industry 1997, Special Report 52, is the 17th annual report produced jointly by the Departments of Natural Resources and Commerce & Economic Development through their Division of Geological & Geophysical Surveys (DGGS) and the Division of Trade & Development (DTD) respectively. To save space, avoid confusion, and to conform to the units (ounces, tons, feet, and miles) that most miners use, metric units have been eliminated in this report. A conversion table can be found inside the back cover.

The report is designed to provide current, accurate, and technically reliable information about Alaska's mineral industry. The publication is made possible by the voluntary cooperation of government agencies, private industry, and individuals that provide information about their activities and operations. Without them this report could not exist, and we are grateful for their help.



STATE OF ALASKA
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DEPARTMENT OF COMMERCE & ECONOMIC DEVELOPMENT
Deborah B. Sedwick, Commissioner

DIVISION OF TRADE & DEVELOPMENT
Greg Wolf, Director

DEPARTMENT OF NATURAL RESOURCES
John T. Shively, Commissioner

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Publication of this report is required by Alaska Statute 41 "to determine the potential of Alaska land for production of metals, minerals, fuels, and geothermal resources; the location and supplies of groundwater and construction materials; the potential geologic hazards to buildings, roads, bridges, and other installations and structures; and shall conduct such other surveys and investigations as will advance knowledge of the geology of Alaska."

NOTE: Mention of any company or brand name does not constitute endorsement by any branch or employee of the State of Alaska.

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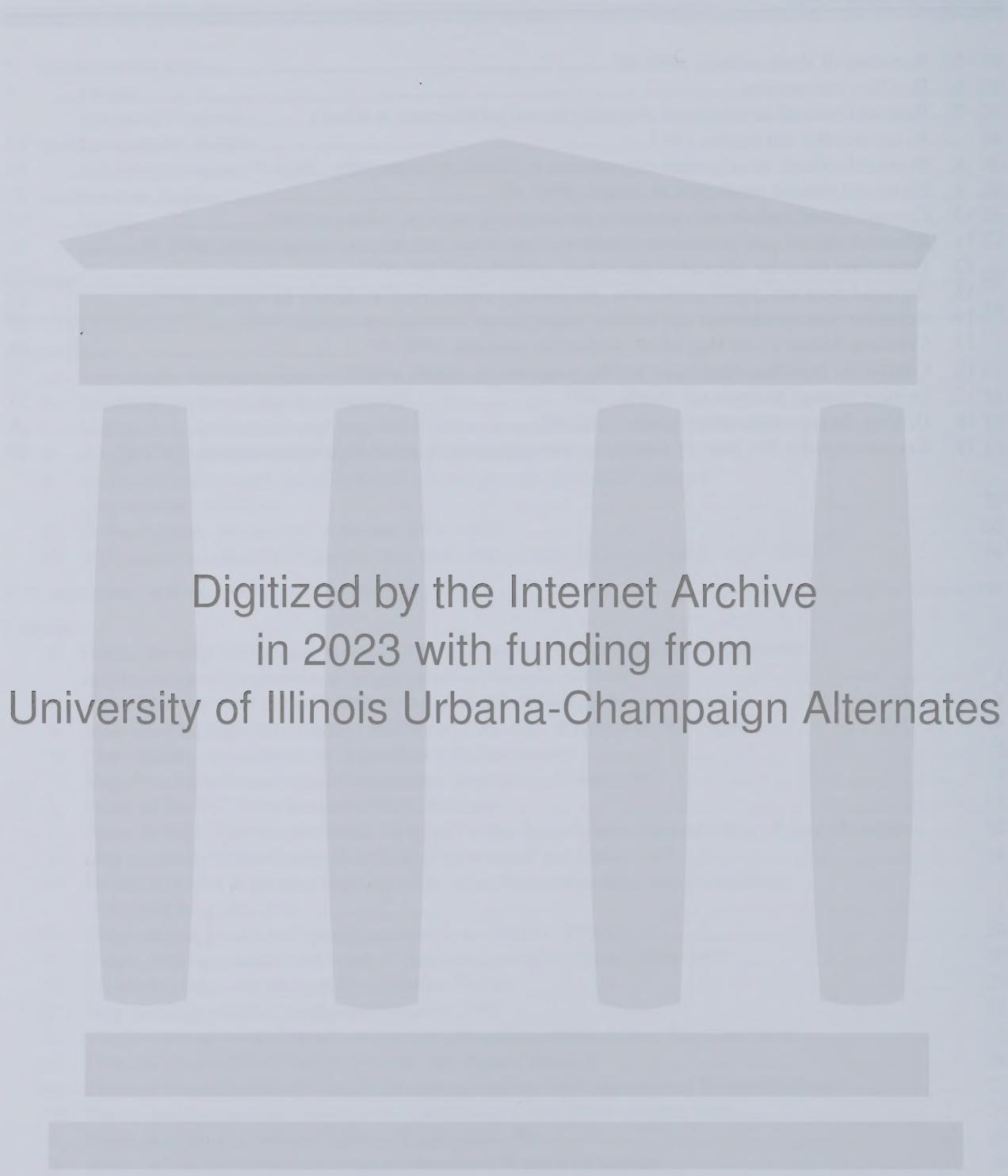
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Alaska's Mineral Industry 1997

R.C. Swainbank,¹ K.H. Clautice,² and J.L. Nauman³

INTRODUCTION

This report summarizes Alaska's mineral activity during the 1997 calendar year and is made possible by information provided by individuals, companies, and government agencies in response to questionnaires mailed by the Division of Geological & Geophysical Surveys (DGGS) in the Department of Natural Resources (DNR). It is a cooperative venture between DGGS and the Division of Trade and Development (DTD) in the Department of Commerce & Economic Development (DCED), with the assistance of the DNR Division of Mining & Water Management (DMWM).

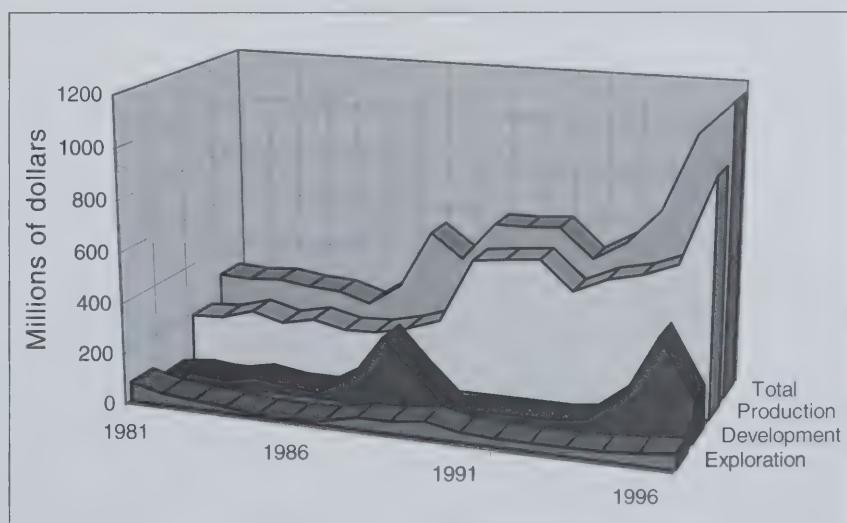
The cumulative value of mineral production, exploration investment, and development expenditures in 1997 was \$1.16 billion (table 1; fig. 1), a slight advance over the \$1.03 billion total in 1996. Exploration increased a healthy 30 percent over the 1996 value to \$57.8 million, a level not seen since 1990. Although 1997 development expenditures of \$168.4 million were only 43 percent of the 1996 value, production from the mines under development or expansion in 1996 resulted in a 1997 value of \$936.2 million, an increase of 59 percent over the previous year, more than offsetting the decreased development investment.

Table 1. *Total value of the mineral industry in Alaska by year (in millions of dollars)*

	Exploration (expenditure)	Development (expenditure)	Production (value)	Total
1981	\$ 76.0	\$ 26.4	\$ 188.6	\$ 291.0
1982	45.0	41.6	196.4	283.0
1983	34.1	27.8	232.4	294.3
1984	22.8	53.6	199.4	275.8
1985	9.2	34.1	226.6	269.9
1986	8.9	24.3	198.5	231.7
1987	15.7	100.3	202.4	318.4
1988	45.5	275.0	232.2	552.7
1989	47.8	134.3	277.0	459.1
1990	63.3	14.3	533.0	610.6
1991	39.9	25.6	546.5	612.0
1992	30.2	30.0	560.8	621.0
1993	30.3	27.7	448.7	506.7
1994	31.1	44.9	507.5	583.5
1995	34.3	148.6	537.2	720.1
1996	44.6	394.0	590.4	1,029.0
1997	57.8	168.4	936.2	1,162.4
TOTAL	\$636.5	\$1,570.9	\$6,613.8	\$8,821.2

SOURCE: Alaska's mineral industry reports published annually by DGGS.

Figure 1. *Alaska's mineral industry total value, 1981-97.*



¹Alaska Division of Trade and Development, 751 Old Richardson Hwy., Suite 205, Fairbanks, Alaska 99701-4948.

²Alaska Division of Geological & Geophysical Surveys, 794 University Avenue, Suite 200, Fairbanks, Alaska 99709-3645.

³Alaska Division of Trade & Development, 9th Floor, State Office Bldg., Juneau, Alaska 99811.

Exploration highlights in 1997 include continued success at gold prospects such as True North, Ester Dome, and Golden Summit near Fairbanks, Donlin Creek and Golden Horn near Flat, and Pogo near Delta. Substantial base metal and polymetallic exploration was reported at Red Dog and in the Ambler district near Kotzebue, throughout the eastern interior region, at the Pebble Copper prospect near Iliamna, and at the Niblack Mine on Prince of Wales Island.

Development was reported at Red Dog, Fort Knox, the Kensington gold mine near Juneau, and the Calder Bay limestone deposit on Prince of Wales Island.

Two new hardrock gold mines began production in 1997. Fort Knox, near Fairbanks, began commercial production in March, and the Illinois Creek Mine near Galena poured the first commercial gold in September. During 1997 the Greens Creek polymetallic mine reached full production, the Red Dog zinc-lead mine increased production, and the Nixon Fork gold-copper mine near McGrath maintained production. Placer gold was mined in Nome by Alaska Gold Co., in the Fairbanks area by Cripple Creek joint venture and by Polar Mining, and throughout the state by dozens of smaller operations. Usibelli Coal Mine near Healy was again the only operational coal mine in the state.

Note that there is a vague line between exploration and development, and we rely on the companies to make that distinction. The value of production is calculated using the average spot price of the metal on the London Metal Exchange multiplied by the quantity of the metals produced, as reported by companies. It does not take

into account items such as smelter charges and penalties, or shipping costs. Forward sales at higher than spot prices are used if reported by a company.

EMPLOYMENT

Table 2 and figure 2 show the reported employment in the mineral industry in Alaska in 1997.

The total of 3,862 jobs represents a 3 percent increase over the previous year and is considered to be conservative because many of the questionnaires were not returned. The decrease in development jobs was due to the Fort Knox and Illinois Creek mines becoming operational, and this is reflected in the increase in lode gold employment. There was also an increase in employment in all hardrock mines in 1997 due to the increased production at Red Dog and Greens Creek, and the commissioning of the Fort Knox and Illinois Creek mines.

Employment in coal mining and in rock production was essentially the same as in 1996, but due to extensive road building, particularly in the southcentral and southeastern regions of the state, there was a substantial increase in employment in sand and gravel production in 1997.

EXPLORATION

Reported exploration expenditures statewide in 1997 were \$57.8 million, up 30 percent from the \$44.6 million invested in 1996. Over half of the activity was in the

Table 2. *Estimated Alaska mine employment, 1991–97^a*

	1991	1992	1993	1994	1995	1996	1997
Gold/silver mining							
Placer	1,240	1,251	1,205	1,150	975	825	780
Lode	N/A	N/A	N/A	--	38	138	415
Polymetallic	35 ^b	240 ^b	26	--	--	68	230
Base metals	331	349	376	311	397	407	478
Recreational	320	325	270	280	255	260	270
Sand & gravel	685	640	580	640	577	598	700
Building stone	165	145	205	210	200	149	123
Coal	115	115	109	115	120	115	118
Peat	45	40	49	55	30	38	42
Tin, jade, soapstone, ceramics, platinum	25	20	20	25	20	20	20
Mineral development	133	164	132	115	637	862	409
Mineral exploration	268	137	164	182	157	257	277
TOTAL	3,362	3,426	3,136	3,083	3,406	3,737	3,862

^aCalculated on a 260-day work year.

^bRevised estimate based on new company data.

N/A = Not available.

-- Not reported.

eastern interior region, followed by the southwestern and southeastern regions. Precious metals were the most sought after targets, closely followed by polymetallic projects. Highlights include: a doubling of the reserves at the Paalaaq deposit at Red Dog; doubling of the resource at Pebble Copper near Iliamna to almost 11 million ounces of gold and 6 billion pounds of copper; increasing the gold resource of Donlin Creek to 6.7 million ounces; and the definition of a 4.5-million-ounce geologic reserve at the Pogo gold deposit near Delta.

DEVELOPMENT

Development investment of \$168.4 million in 1997 was less than half of the \$394.0 million in 1996, and was predominantly at the Red Dog Mine and port site associated with the production rate increase project due to be phased in beginning in 1998. Smaller development projects were reported at most of the active mines in the state, including Illinois Creek, Nixon Fork, Usibelli Coal, Fort Knox, Greens Creek, Kensington, and dozens of placer gold mines.

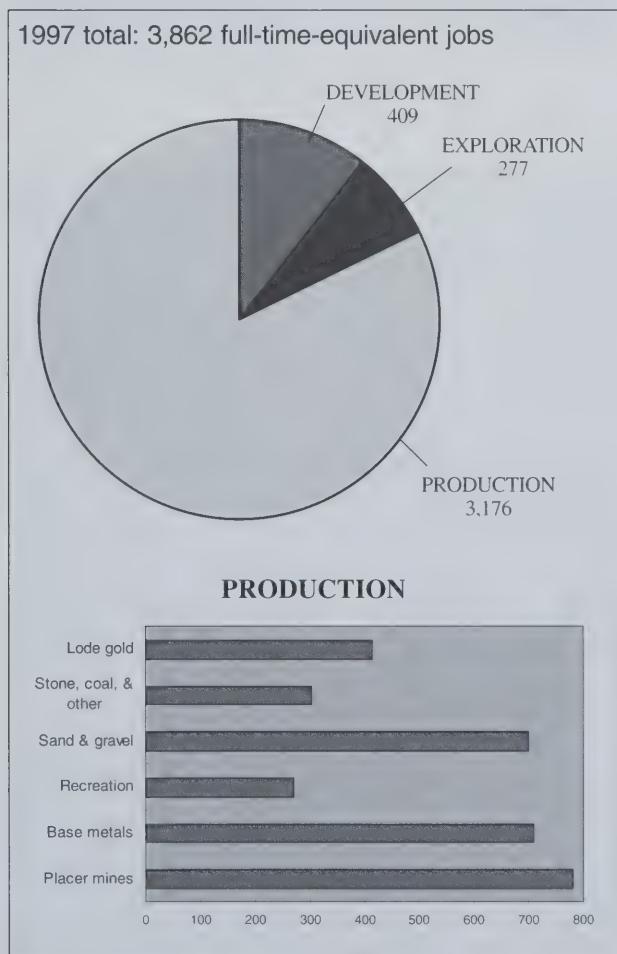


Figure 2. 1997 mineral industry employment by category.

PRODUCTION

The reported gross value of Alaska's mineral products in 1997 was \$936.2 million, up 59 percent from the \$590.4 million reported in 1996. Increased efficiency of metal recovery at Red Dog, and a higher price for the zinc product translated to a \$102 million operating profit for Cominco, up from \$25 million in 1996. The Greens Creek Mine achieved targeted production levels, as did the Nixon Fork Mine. Although plagued by lack of water, the Illinois Creek gold-silver mine managed to reach commercial production by September, and the new Fort Knox mine added a little over 1,000 ounces of gold per day to the state's production.

GOVERNMENT ACTIONS

Four government-sponsored airborne geophysical surveys were completed in 1997. DGGS contracted for one in the Talkeetna Mountains and one in the Ruby-Poorman area, and the U.S. Bureau of Land Management (BLM) contracted for a survey of the Wiseman area in the Brooks Range, and together with the City of Wrangell surveyed the islands around that community. These detailed surveys are thought to be the first in the nation funded by a federal agency.

In a cooperative venture, the U.S. Geological Survey and the DNR Division of Mining and Water Management began an intensive water-quality baseline study of the whole drainage basin of the Fortymile River. It is hoped that the results will provide factual data for future policy decisions.

Several mines received awards for superlative reclamation, including Cambior Alaska's Valdez Creek Mine, which won the prestigious national "Health of the Land Award" from BLM.

The Mental Health Lands Trust issue was finally settled in 1997 when an appeal by some plaintiffs to the State Supreme Court was denied.

ACKNOWLEDGMENTS

The authors wish to thank all the companies, agencies, and individuals who responded to the questionnaires. Without your voluntary and timely information this report would not be possible.

Joni Robinson of DGGS mailed 1,092 questionnaires in November 1997, and received 194 replies. Dick Swainbank, with the help of Karen Clautice, Jan Nauman, and Mitch Henning, prepared the body of the text and appendixes. The cover design is by Ann-Lillian Schell and graphic illustrations are by Alfred Sturmann, Joni Robinson, and Gail Davidson. Paula Davis edited the final version, and Joni Robinson completed the layout and design. Publication was made possible by funds from the Division of Trade & Development.

EXPLORATION

Figure 3 shows the regions of the state described in this and subsequent sections.

Statewide exploration expenditures reported in 1997 were \$57.8 million, up 30 percent from the \$44.6 million spent in 1996. Tables 3 and 4 show the regional distribution and the commodities sought, and figure 4 is a graphic from table 4. Gold continues to be the most favored metal, but in recent years polymetallic deposits which contain gold and silver in addition to base metals such as copper, lead, and zinc, have become more popular. Figure 5 shows the location of the more significant exploration projects.

Table 5 is a summary of mining claim activity during the last 8 years. Slightly fewer state mining claims and slightly more federal mining claims were staked in 1997 than in 1996, but the number of active claims, both federal and state, increased in 1997.

Most of the increase in federal mining claims was in the eastern Alaska Range and in the vicinity of the city of Wrangell, where BLM and the City sponsored an airborne geophysical survey in 1997.

Other areas of the state where large numbers of claims were staked include the Ambler-Survey Pass

area of the Brooks Range (Kennecott), Pebble Copper near Iliamna and near Ruby (Cominco), Pogo near Delta Junction (WGM), and in the vicinity of Paxson in the central Alaska Range.

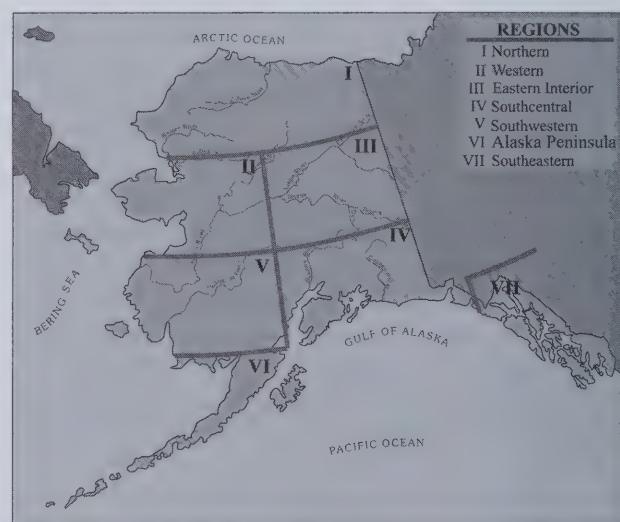


Figure 3. Regions of mineral activity in Alaska as described in this report.

Table 3. Reported exploration expenditures and employment in Alaska, 1997

	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	Total
Exploration expenditures								
Base metals	\$1,700,000	\$ --	\$ --	\$ --	\$ --	\$ --	\$ --	\$ 1,700,000
Polymetallic	1,525,000	147,000	10,062,000	73,000	2,200,000	---	8,340,000	22,347,000
Precious metals								
Placer	210,000	215,000	366,000	37,000	296,000	---	126,000	1,250,000
Lode	--	2,635,000	19,659,500	255,000	8,801,000	---	360,000	31,710,500
Coal and peat	--	--	200,000	520,000	--	--	--	720,000
Industrial minerals	15,000	--	10,000	30,000	--	25,000	--	80,000
Other ^a	--	--	--	--	--	--	--	--
TOTAL	\$3,450,000	\$2,997,000	\$30,297,500	\$915,000	\$11,297,000	\$25,000	\$8,826,000	\$57,807,500
Exploration employment								
Employment								
Workdays	7,410	4,227	36,170	1,177	14,768	30	8,268	72,050
Workyears ^b	29	16	136	5	57	0	34	277
Number of companies reporting ^c	7	18	61	15	10	1	11	123

-- Not reported.

^aJade, platinum, gemstones.

^bBased on 260-day workyear.

Exploration highlights in 1997 were the expansion of reserves at the deep Paalaaq deposit near Red Dog, definition of a 4.5 million ounce gold resource at Pogo, doubling of the resource at Pebble Copper to about 11 million ounces of gold, almost doubling the resource at Donlin Creek to 6.7 million ounces of gold, and the addition of about 450,000 ounces to the gold reserve at Fort Knox.

NORTHERN REGION

Exploration expenditures reported in this region in 1997 were \$3.45 million, as compared with \$1.25 million in 1996.

METALS

At the Red Dog Mine near Kotzebue about 29,300 feet of exploration drilling continued on the new Paalaaq massive sulfide deposit discovered in 1996 at depths of 400 to 1,200 feet below surface. The new base-metal orebody is 100 to 200 feet thick, with some thicker sections over an area of 600 by 3,300 feet, and is open in all directions, with the north and west being the most favorable areas for increased reserves. This orebody has been named

Paalaaq, after a distinguished Native elder. Table 6 shows the reserves as of December 31, 1997. These new reserves make the Red Dog the largest zinc orebody ever known in the world.

Farther east, NANA and Kennecott drilled about 5,000 feet on the Bornite Mississippi Valley-type copper deposit, and following the airborne surveys of 1996 Kennecott staked a very large group of claims in the Ambler-Survey Pass area. The company also continued exploration in the Ambler copper belt, which contains its Arctic Kuroko-type deposit (see Appendix D, number 9).

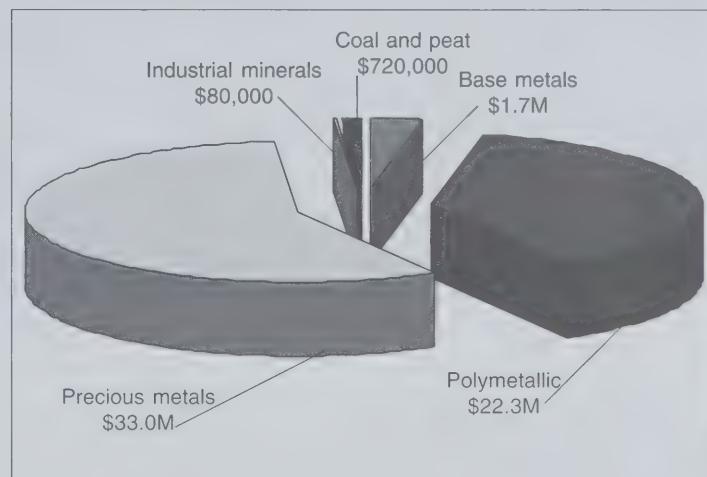


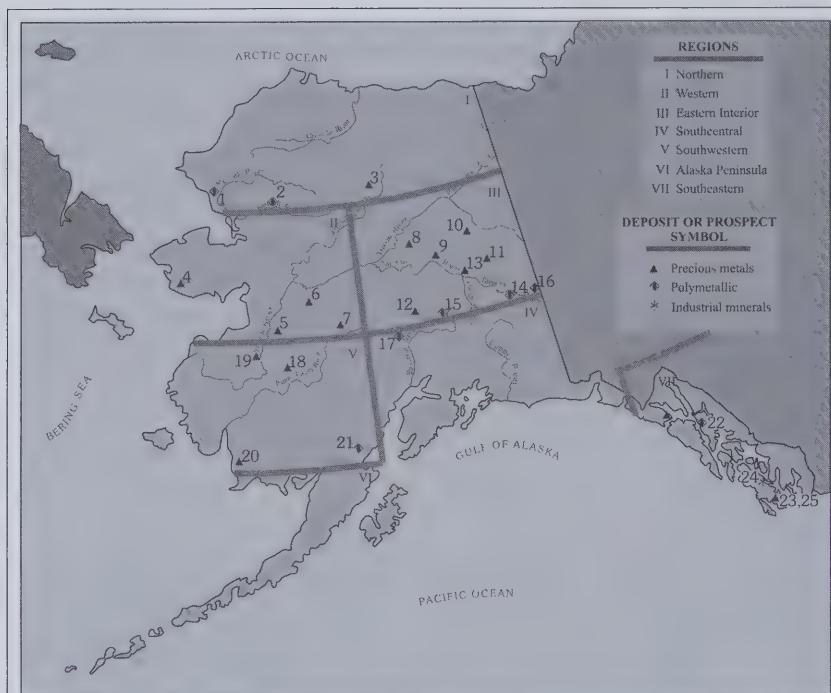
Figure 4. 1997 exploration expenditures by commodity.

Table 4. Reported exploration expenditures in Alaska by commodity, 1982–97

	Base metals	Polymetallic ^a	Precious metals	Industrial minerals	Coal and peat	Other	Total
1982	\$31,757,900	\$ N/A	\$ 10,944,100	\$ --	\$ 2,900,000	\$ 15,300	\$ 45,617,300
1983	9,758,760	N/A	20,897,555	2,068,300	1,338,454	70,000	34,133,069
1984	4,720,596	N/A	14,948,554	270,000	2,065,000	279,500	22,283,650
1985	2,397,600	N/A	6,482,400	--	270,000	--	9,150,000
1986	1,847,660	N/A	6,107,084	170,000	790,000	--	8,914,744
1987	2,523,350	N/A	11,743,711	286,000	1,150,000	31,000	15,734,061
1988	1,208,000	N/A	41,370,600	160,200	2,730,000	--	45,468,800
1989	3,503,000	N/A	43,205,300	125,000	924,296	5,000	47,762,596
1990	5,282,200	N/A	57,185,394	370,000	321,000	97,000	63,255,594
1991	4,789,500	N/A	34,422,039	92,000	603,000	2,000	39,908,539
1992	1,116,000	3,560,000	25,083,000	25,000	425,000	--	30,209,000
1993	910,000	5,676,743	23,382,246	163,500	--	125,000	30,257,489
1994	600,000	8,099,054	18,815,560	225,000	2,554,000	810,000	31,103,614
1995	2,770,000	10,550,000	20,883,100	100,000	--	3,000	34,306,100
1996	1,100,000	11,983,364	31,238,600	400,000	--	--	44,721,964
1997	1,700,000	22,347,000	32,960,500	80,000	720,000	--	57,807,500
TOTAL	\$75,984,566	\$62,216,161	\$399,669,743	\$4,535,000	\$16,790,750	\$1,437,800	\$560,634,020

^aPolymetallic deposits considered as a separate category for the first time in 1992.

N/A = Not available.



I Northern Region

1. Red Dog Mine—Cominco Alaska Inc.
2. Ambler mineral belt—Kennebott Exploration Co.
3. Wiseman area—Ventures Resource Alaska Corp.

II Western Region

4. Nome area—Kennebott Exploration Co., Cominco Alaska Inc., Altar Resources
5. Illinois Creek—Dakota Mining Corp.
6. Ruby area—Cominco Alaska Inc., Placer Dome U.S. Inc.
7. Nixon Fork—Consolidated Nevada Goldfields Corp.

III Eastern Interior Region

8. Sawtooth Mountain—ASA Inc./Montague J-V
9. Fairbanks district
 - a. True North—Newmont Exploration Ltd.
 - b. Fort Knox—Fairbanks Gold Mining Inc.
 - c. Ester Dome—Silverado Gold Mines Ltd.
 - d. General—Amax Gold Exploration, Placer Dome U.S. Inc.
 - e. Golden Summit—International Freegold Inc.
10. Circle district—LaTeko Resources
11. Pogo—Teck Corp./Sumitomo Metal Mining Canada Ltd.

12. Bonnfield district—Liberty Bell Mining, Grayd Resource Corp.
13. Richardson district—Kennebott, Cyprus-Amex, Golden Phoenix Minerals Inc. Tri-Valley Corp.
14. Tok area—American Copper & Nickel Co. Inc. (ACNC)
15. Nikolai—ACNC/Fort Knox Gold Resources Inc. (FNGRI)
16. Taurus—Cross Canada International Resources

IV Southcentral Region

17. Upper Chulitna area—Addwest Minerals Inc., Kennebott Exploration Co.

V Southwestern Region

18. Donlin Creek—Placer Dome U.S. Inc., Cominco Alaska Inc., Ventures Resource Alaska Corp.
19. Stuyahok—Calista Corp.
20. Goodnews Bay—Corral Creek Corp.
21. Pebble Copper—Cominco Alaska Inc.

VI Alaska Peninsula Region

VII Southeastern Region

22. Greens Creek—Kennebott Greens Creek Mining Co.
23. Dolomi—Sealaska Corp.
24. Calder Bay—Sealaska Corp.
25. Niblack—Abacus Minerals Inc./Teck Corp.

Figure 5. Selected exploration projects in Alaska, 1997.

At the eastern end of the southern Brooks Range near Wiseman, Silverado Gold Mines continued exploration for the lode source of the large nuggets found in its Nolan Creek placer gold mine. Gold Dust Mines reported some exploratory drilling in the Chandalar Lake area, and Steve Greene explored in the Koyukuk drainage, but was plagued by the lack of water.

Ventures Resource Alaska found good copper values (3 plus percent) over substantial widths (20 to 30 feet) on the Luna deposit and on the Venus skarn prospect northeast of Wiseman. The Luna also contains zinc, cobalt, silver, and gold, while the Venus contains silver and gold. These prospects are on lands controlled by Doyon Ltd.

In an unusual arrangement, BLM contracted with On-Line Exploration and Sial Geosciences to conduct an airborne geophysical survey of the Chandalar copper belt northeast of Wiseman. The survey area contains the Venus and Luna prospects and the Nolan area west of the haul road. The program was managed by DGGS to conform to the standards set in almost a dozen surveys elsewhere in the state.

INDUSTRIAL MINERALS

The NANA Corp. explored for sand and gravel resources near some of the villages in the region, but there was no exploration for coal in the northern region in 1997.

WESTERN REGION

Exploration expenditures reported in this region in 1997 were \$3.0 million, down from \$3.8 million the previous year, primarily due to reduced exploration on lands north of Nome.

METALS

Cominco continued exploration in the Aurora trend north-west of Nome both on land owned by the Bering Straits Native Corp. and on

Table 5. Summary of claim activity, 1990–97

Year	1990	1991	1992	1993	1994	1995	1996	1997
New claims								
State	2,573	3,391	2,606	2,042	3,365	4,889	10,716	10,002 ^a
Federal	1,888	1,299	695	601	341	376	1,571	1,872
Subtotal	4,461	4,690	3,301	2,643	3,706	5,265	12,287	11,874
Active claim assessment								
State	32,275	29,754	26,615	25,684	22,601	20,217	25,586	27,602
Federal	25,792	23,222	20,254	9,298	8,495	7,766	9,346	11,320
Subtotal	58,067	52,976	46,869	34,982	31,096	27,983	34,932	38,922
Total state	34,848	33,145	29,221	27,726	25,966	25,106	36,302	37,604
Total federal	27,680	24,521	20,949	9,899	8,836	8,142	10,917	13,192
TOTAL	62,528	57,666	50,170	37,625	34,802	33,248	47,219	50,796

^aIn addition, 2,239 new prospecting sites, equivalent in area to 8,956 mining claims, were located in 1997. Includes 3,969 new claims on State-selected land.

Information provided by Ronna Graham (Division of Mining & Water Management) and Don Baggs (U.S. Bureau of Land Management).

claims leased from Altar Resources or owned by Cominco. The company had a modest geophysics and drilling program in the area in 1997.

Much of the land covered by the 1993 state airborne geophysical survey is now under claim, and there was a lot of activity east of Nome, where Intercontinental Mining drilled 6,000 feet of core on the Big Hurrah Mine. Visible gold was evident in several holes, and hole 3 cut 30 feet with a gold grade of 0.134 ounces per ton and 15 feet of 0.108 ounces per ton. Hole 5 cut 17.5 feet of 0.212 ounces per ton.

Numerous individuals are actively exploring the Seward Peninsula for placer gold, including Buckley Mining on Slate Creek, Don Harris on Moore Creek, High Bench Mining at Nekula Gulch, Lost River Mining at Tripple Creek, Dennis Nottingham in the Kougarok, Scotti Mining in Council and the Kougarok, Edwin Sears west of Nome, and Thurman Oil & Mining on Bering Straits Native Corporation land in Dahl Creek.

Late in the year La Teko Resources Ltd. announced that it had acquired the Mt. Distin prospect north of Nome from Kennecott Exploration, but the option was allowed to lapse. Kennecott had a modest exploration program of its own at Mt. Distin.

USMX of Alaska Inc. reported minor geochemistry, geologic mapping and drilling for gold and silver near its Illinois Creek mine south of Galena. Reserves at year end, at a gold price of \$330 per ounce, stood at 1.9 million tons of 0.076 ounces of gold and 1.16 ounces of silver per ton.

Table 6. Red Dog ore reserves^a

	Tons (millions)	Zinc (wt%)	Lead (wt%)	Silver (oz/ton)
Main	55.8	19.0	5.2	2.89
Aqqaluk	80.4	13.6	3.7	1.90
Hilltop	10.6	17.8	5.5	3.42
Paalaaq	15.5	14.3	3.9	2.42
Total	162.3	15.8	4.4	2.39

^aAs of December 31, 1997.

Consolidated Nevada Goldfields had a substantial exploration program on its own claims and on land leased from Doyon Ltd. near the Nixon Fork Mine.

Exploration by Cominco and Placer Dome in the Central Kuskokwim Mountains and near Ruby resulted in the staking of mining claims by both companies, and Placer Dome drilling at Colorado and Ganes creeks. Corral Creek Resources Inc. also staked claims in the Ruby area. Little Creek Mine reported some exploration on 10-Pup off Little Creek.

There was exploration activity in the Melotzitna area west of Tanana by Footwall Exploration, and Ventures Resource had a trenching program west of Tanana on a coincident geochemical and geophysical anomaly.

DGGS contracted with WGM-Dighem to fly an airborne geophysical survey of the Ruby–Poorman area in 1997, with the results released in February 1998.

No exploration for coal or industrial minerals was reported in 1997 in this region.

EASTERN INTERIOR REGION

Reported exploration in the eastern interior region was \$30.3 million in 1997, up 65 percent from 1996. Several junior mining companies were very active, acquiring land positions by staking claims and by leasing or purchasing existing prospects and properties.

METALS

Fairbanks Gold Mining Inc., operator of the Fort Knox gold mine, had a 12-hole, 5,000-foot exploratory reverse-circulation drilling program on the Gil East claims about 8 miles east of the Fort Knox Mine, where the best of six mineralized holes returned 170 feet of 0.048 ounces per ton gold.

Newmont Exploration Ltd. continued an aggressive exploration and acquisition program with La Teko Resources on the True North property about 8 miles west of the Fort Knox mine. Newmont can earn 65 percent ownership by spending \$21 million and producing a feasibility study. Mineralization at True North is associated with quartz-carbonate veins in a high-grade metamorphic package containing calcareous eclogites, particularly where carbonaceous schists and quartzite are prevalent. Northwest-trending fractures along the northeast-trending Eldorado Creek Fault seem to have offset and possibly control the higher-grade zones. Prior to this year's 55,000-foot reverse-circulation and core drill programs, and the discovery of the Merlyn and Dome Creek mineralized zones, geologic resources were calculated to be 1.3 million ounces of gold.

Placer Dome North America also had a drill program to the southwest of True North in the same type of rocks. La Teko contracted for a closely-spaced airborne geophysics program for its large Juniper Creek prospect about 15 miles northeast of the True North property, and for the adjacent Twin Buttes block that it leased from the University of Alaska. Several interesting anomalies were found in 1997 in the Twin Buttes block, and more claims were acquired.

La Teko Resources also had encouraging results, including gold-in-soil anomalies up to 0.07 ounces per ton at the Discovery Gulch prospect in the Circle district. The company also agreed to sell its Ryan Lode Mine on Ester Dome (6 miles west of Fairbanks) to Silverado Gold Mines for \$12 million. Ryan Lode has proven/probable reserves in the schist-hosted Ryan Shear and igneous-hosted Curlew deposits to 300-foot depth of 820,000 ounces of gold. The shear extends at least to the 1,100 foot depth.

Silverado drilled a total of 8,800 feet of reverse circulation holes on the Ryan Lode as part of its due-

diligence review of the mineral potential in 1997, but has since relinquished its option.

Silverado also controls most of the land around La Teko's Ester Dome property, including the former producer, Grant Mine, about 2 miles northeast of Ryan Lode. Mineralization at Grant Mine in the Irishman and O'Dea veins extends to at least 1,200 feet in depth and may represent an offset continuation of the Ryan Shear deposit. Elsewhere on Ester Dome, Silverado drilled and trenched the St. Paul zone (about a mile north of, and subparallel to, the Ryan Lode), and has outlined igneous-hosted gold mineralization at the Rhyolite prospect on the northwestern side of the dome. Silverado also holds claims immediately northeast of True North at the Whiskey Gulch and Marshall Dome blocks.

Cripple Creek Joint Venture found mineralized intrusive rock in the floor of its placer operation at Ester, west of Fairbanks, and collected samples for assay.

International Freegold Mineral Development had a robust exploration program managed by Avalon Development Corp., including 10,000 feet of reverse-circulation drilling and 3,600 feet of core drilling at various prospects within its 22,560-acre landholdings of the Golden Summit project. Barrick Gold has the right to buy up to 70 percent of the project by purchase of \$10 million in Freegold stock over the next 4 years. The Golden Summit property contains several old mines (Cleary Hill, Newsboy, Tolovana, Christina, Hi-Yu) with gold grades from 0.29 ounces per ton to more than one ounce per ton. Recent drilling shows that the Cleary Hill Mine, in addition to a 100,000-ounce resource grading 0.81 ounces per ton, has potential for bulk tonnage, lower-grade material in the footwall of the high-grade veins.

The Golden Summit property also contains the Dolphin igneous-hosted gold-bearing system west of the Cleary Hill Mine which has drill-indicated reserves of 30.6 million tons at a grade of 0.02 ounces per ton, but is still open to the east, west, and at depth. Elsewhere on the property there are numerous early- to mid-stage prospects (Charles, Northern Extension, Wolf Creek, Goose Creek, Too Much Gold, and Iowa) that are being systematically explored. Several are strategically situated relative to the eastern extension of the Eldorado Creek Fault that bounds the True North property.

Placer Dome transferred ownership of its 20,000-acre holdings northeast and southwest of True North to International Freegold on November 5, 1997.

There was no activity reported at Can-Ex Resources' Eagle Creek project west of True North, but newly-staked claims to the west of Eagle Creek, including the mineralized Our Creek igneous stock, were being explored in 1997. Cyprus-Amex explored on the nearby Old Dog prospect, and drilled 2,700 feet of reverse-circulation hole, in addition to reconnaissance

work in the Fairbanks area. Grateful Dog Mining Company reported exploration in the same general area, and also on Wilber Creek near Livengood.

At the Pogo prospect 40 miles northeast of Delta Junction, Teck Corp. started its buy-in to Sumitomo's project in June by funding the \$5.5 million, 46-hole, 47,200-foot 1997 drilling program, which was supported by five drills and a 45-person crew. Teck announced that Pogo contains a geologic reserve of almost 4.5 million ounces of gold in 10.9 million tons of rock in two 24-foot-thick, flat-lying veins, with a possible third layer below. The gold occurs as veins in almost horizontal quartzite about 400 feet below a steep-sided valley, so advanced exploration will be from underground. To date over 42 line-miles of induced polarization (IP) survey, 35 line-miles of constant source audio magneto telluric (CSAMT) survey, 10 miles of magnetic survey, 385 miles of airborne electromagnetic (AEM) survey and 83,903 feet of drilling have been completed. An ice road was constructed to transport fuel and equipment to the site of the access tunnel portal.

Tri-Valley Corp. had a 5,000-foot core and reverse-circulation drill program on its large block of claims in the Richardson district about 40 miles west of Pogo, and Ventures Resource Alaska Inc. confirmed high-grade silver-lead-zinc mineralization on its Eva prospect about 50 miles to the east of Pogo.

Ventures Resource also drilled 3,000 feet of core on the north and west sides of a 3,000 by 4,000 foot geochemical anomaly at the Champion II prospect. At Lead Creek, 30 miles southwest of Eagle, Ventures drilled 3,800 feet on a coincident soil silver-lead-zinc and electromagnetic anomaly. Several holes cut 3.5-foot-thick massive sulfide mineralization in silicified and brecciated limestones with up to 8.8 ounces of silver per ton, 14.2 percent lead and some zinc. Thicker mineralized horizons were also encountered. At the Eva prospect a vein with at least 1,800 feet of strike length assayed 28.7 percent lead, 9.4 percent zinc, 0.28 percent copper, 0.003 ounces per ton gold and 19.4 ounces of silver per ton across an 18-foot trench sample. All of these prospects are on land controlled by Doyon Ltd. In late November, Teck Corp. agreed to invest \$4.1 million in Ventures to explore the Veta block, with an option to invest \$3.5 million more to acquire 60 percent of a target of their choice within the area.

American Copper & Nickel Company (ACNC) had a 16,000-foot diamond drill program on its Delta project southwest of Tok, and managed its Nikolai joint venture for which Fort Knox Gold Resources Inc. provided the funds. A 7,500-foot core-drill program in the 3.5-mile strike length of the Ice prospect near Canwell Glacier cut mafic and ultramafic rocks with 17 feet of 0.78 percent nickel, 0.55 percent copper, 0.023 ounces per ton

platinum, 0.026 ounces per ton palladium and 0.006 ounces per ton gold. Elsewhere in the Nikolai project a 6,566-foot six-hole drill program at the Fish Lake prospect cut 278 feet with up to 10 percent disseminated pyrrhotite, with assays ranging from 0.03 to 0.26 percent copper, 0.16 to 0.36 percent nickel, 35 to 220 ppb platinum and 60 to 222 ppb palladium. An 80-foot intercept and a 190-foot intercept in two other holes cut disseminated sulfides with similar grades. At year end Grayd Resource Corp. acquired an interest in the Delta Project in addition to several other polymetallic properties through agreements with Pacific Northwest Resources Company and Pacific Alaska Resources Corp.

Several other companies were active in the Nikolai area, including Falconbridge Ltd., Tullaree Alaska Inc., and Golden Phoenix Minerals Company. The mineralization at Nikolai is hosted in Triassic(?) mafic and ultramafic plutonic and volcanic rocks cut off to the north by a strand of the Denali Fault system. The offset portion of the mafic rocks would be expected to occur near Kluane Lake.

North of Tok, Cross-Canada International had a modest program on the Taurus copper-gold porphyry.

In the Bonnifield district east of Healy, Liberty Bell Mining had a 5,000-foot core-drill program on the epithermal-type gold prospect, and Grayd Resource Corp., with the backing of Atna Resources, had a 12,900-foot core-drill program on the Red Mountain zone of the Dry Creek massive sulfide project. One hole in this 6,000-foot conductive zone cut 18 feet of 25.9 percent zinc, 11.7 percent lead, 0.88 percent copper, 10.1 ounces per ton silver, and 0.1 ounces per ton gold. Sulfides were also found 2,400 feet along strike. The WTF zone of the project may be on the north limb of a synclinal structure, with the Red Mountain zone on the south limb. Grayd also investigated a 4,000-foot electromagnetic conductor at Anderson Mountain 16 miles west of Red Mountain, and is preparing a second drill rig for the 1998 season (fig. 6).

In the Rampart-Manley area, numerous large claim groups have been staked and at least one airborne geophysical survey was conducted. ASA continued its evaluation of Doyon land in the area east of Manley, with a 1,000-foot core-drill program. Placer Dome had a core-drill program on holdings leased from Alaska Placer Development at Livengood.

There was a little activity in the Sourdough Creek area midway between Fairbanks and Circle following a major staking program in 1996.

Placer exploration was reported in the Rampart-Manley area by Bed Rock Enterprises (Killarney Creek and Roughtop Mountain); BIFS Mining and Eleven Pup Mining (Eureka Creek), and Slate Creek Mining on Slate Creek. Alaska Placer Development drilled almost

18,000 feet of reverse-circulation exploration holes on Livengood Bench in the Livengood district. In the Circle district placer exploration was reported by Eugene Clyne on Crooked Creek; Colledge Enterprises on Bottom Dollar Creek; Fred Cook and Points North on Portage Creek; Dan Fair on Ptarmigan Creek; Paul & Company on Bonanza Creek; and Underwood Mining on Bonanza and Porcupine Creeks. In the Fairbanks district A.M. Mining Ltd. explored on Dome Creek, Lucky Seven Mining Co. tested the placers on Gilmore Creek, and Tillicum Resources Inc. tested at Fox. The only placer exploration reported in the Bonnifield district was drilling on 50-foot centers by D'Log Industries Inc. at an undisclosed location. The Fortymile River drainage saw a lot of placer exploration in 1997, with Adam Argo on the South Fork, Harvey Bickell on the Walker Fork, Scott Reed on the North Fork, Geoquest on Chicken Creek, and Guy Fichtelman worked both east and west of Chicken. Paystreak Mining explored near Jack Wade, EBP mapped and sampled the Smith Bench, Chickaman Mining worked on Uhler Creek, Leo Regner explored Lilliwig and Ingle creeks, 40-Mile Mining Co. drilled on Dry Gulch near Chicken, and Camp Creek Mining explored at an undisclosed location in the Fortymile district.

COAL

Usibelli Coal Mine Inc. reported a 4,000-foot reverse-circulation exploration drill program around its leases at Poker Flats, Two Bull Ridge and Gold Run Pass.

INDUSTRIAL MINERALS

Globe Creek Mining Inc. had a mapping and geochemical sampling program at its limestone operation at Globe Creek midway between Fairbanks and Livengood.

SOUTHCENTRAL REGION

Investment in exploration in the southcentral region in 1997 was only \$915,000, compared to \$2 million in 1996.

METALS

There was substantial exploration activity in the area, particularly along the south flank of the Alaska Range in the Petersville—Collinsville area and in the Upper Chulitna area south of Cantwell.

In the Valdez Creek area, La Teko Resources had a trenching and sampling program at its Lucky Gulch



Figure 6. Dramatic view of the DC North horizon of Red Mountain. The drill rig can be seen on the structure at the center of the picture. Photo courtesy of Grayd Resources Corp.

prospect, and discovered several anomalous areas for future follow-up. International CanAlaska Resources continued its exploration of the Rainbow Hill prospect nearby. Intercontinental Mining announced its intention to explore the Denali (Pass Creek) copper deposit, which has reserves of about 5 million tons of fine-grained sulfides running about 2 percent copper.

Staking occurred in 1997 in the vicinity of the Golden Zone Mine, following the release of the results of the 1996 airborne geophysical survey. Kennecott drilled one of the more striking conductive zones, and Addwest Minerals International Inc. continued evaluation of the area around the Golden Zone Mine. DGGS began mapping the district to provide ground truth for the geophysical survey.

Numerous prospect sites were located in the Petersville–Collinsville geophysical survey area where unexpected northwest-trending features were evident in this area of predominantly northeasterly-trending geology. Diamond Gold Corporation reported exploration in the Yenlo Hills for disseminated and massive sulfides. H & H Exploration and Mining reported placer exploration near Collinsville, and Northern Mining explored for placer near Petersville.

Placer exploration was also reported near Nelchina (4S Services), at Willow Creek (Mrak Placer Mine), at Eureka Creek and Hatcher Pass (Jagade Perkins Jr.), and at Canyon Creek (Outsider Mining). Placer exploration was also reported on the Kenai Peninsula by Tom Sternberg (Quartz Creek), Sunrise Exploration Services, and Gerald Willard (Bear Creek near Hope). At the old Gilpatrick Mine northwest of Seward, Eric Treider reported hardrock exploration that will continue in 1998.

DGGS contracted for an airborne geophysics survey in the Iron Creek area of the Talkeetna Mountains during the summer of 1997.

COAL

Usibelli Coal Mine Inc. purchased the rights to the Wishbone Hill Mine east of Palmer from North Pacific Mining Corp., a subsidiary of the Cook Inlet Region Inc. Native corporation. Surface mineable coal reserves at Wishbone Hill are about 14 million tons, but the geologic structure is complex. When washed, the coal has a heat content of about 12,200 BTU, as compared with 7,800 BTU for the coal at Usibelli's mine at Healy.

Slightly farther east at the Jonesville coal lease, Nerox Power Systems Inc., a subsidiary of Nerox Energy Corp., working with Sumitomo Coal Mining Co. Inc., drilled two core holes for a total of 4,541 feet into the axis of the syncline at the Evan Jones Mine, finding 44 feet of high-rank coal in two seams over a 225-acre area, suggesting an 18- to 30-million-ton resource.

SOUTHWESTERN REGION

Exploration expenditures in the southwestern region in 1997 were \$11.3 million, about the same as in 1996.

METALS

Placer Dome's activity at Donlin Creek near Flat continued to excite interest in the Kuskokwim Mountains as a whole, and there was renewed interest in the Pebble Copper deposit near Lake Iliamna.

At Donlin Creek, about midway between Bethel and McGrath, Placer Dome had a 52,546-foot core-drill and a 26,892-foot reverse-circulation program continuing evaluation of several areas of gold–sulfide mineralization associated with 65-million-year-old granitic plutons intruded into Jurassic–Cretaceous flysch. The purpose of the program was to identify areas where oxidation of the sulfide-rich ore was deeper, thus increasing the oxide ore inventory. At year-end reserves in all categories were 6.7 million ounces of gold in 67 million tons of ore.

Ventures Resource Alaska drilled 17,128 feet of core in the Flat area; at the Golden Horn Mine another vein was discovered parallel to the former producer, and the potential for bulk-tonnage mineralization was identified. One of the first drill holes cut 27 feet with 0.3 ounces of gold per ton. A separate program at the Chicken Mountain area 5 miles to the south showed 70 feet of 0.416 ounces of gold per ton in one hole, and 6,655 feet of trenching revealed a 90-foot zone that assays 0.193 ounces per ton. The gold-in-soil anomaly associated with these results extends over an area 12,000 by 2,000 feet. Ventures also increased the size of its holdings along the Donlin Creek trend to the northeast of Placer Dome's holdings. Western Mining Corp. (USA) had a modest exploration program in the same area.

Corral Creek Resources continued exploration for platinum at Red Mountain near Goodnews Bay on Calista Corp. lands and the Calista Corp. explored for gold and platinum in the Marshall, Stuyahok, Nyac, Kuskokwim Mountains, and Goodnews Bay areas. The Wylie Operation trenched on the Mt. Top mercury prospect.

Cominco has reportedly discovered higher grades of gold in a portion of its Pebble Copper porphyry deposit north of Lake Iliamna, and several hundred claims were staked in late 1996. Activity in 1997 included 14,600 feet of core drilling which doubled the size of the resource to more than a billion tons containing almost 11 million ounces of gold and 6 billion pounds of copper.

Placer exploration was reported at a number of placer mines. Flat Creek Mining Co. prospected on Flat Creek; Julian Creek Mine was active on the George River; Chicken Creek Mining explored in the Flat-Iditarod area, and H & H Exploration and Mining dug

some test pits at Meadow Lake near Iliamna.

No exploration was reported for coal or industrial minerals in the southwestern region in 1997.

ALASKA PENINSULA REGION

The only exploration in the region was for sand and gravel resources by the Bristol Bay Native Corp.

SOUTHEASTERN REGION

Reported exploration expenditures in this region were \$8.83 million, a slight increase over the \$7.2 million invested in 1996.

METALS

At the Niblack Mine on the southeastern end of Prince of Wales Island, Abacus acquired the Trio and Broadgauge claims east of its main target at the Lookout Zone, and had a 39,000-foot diamond-drill program. They recently announced an inferred mineral resource for the Lookout Zone of 2.78 million tons grading 0.087 ounces per ton gold, 1.14 ounces per ton silver, 1.70 percent copper and 3.30 percent zinc. Abacus and Teck plan a 2,000-foot exploration adit heading west from the Trio Zone into the Lookout for 1998.

The City of Wrangell provided matching funds to the federal Bureau of Land Management to contract an air-

borne geophysical survey of part of Etolin Island, Zarembo Island, and part of Kupreanof Island near Wrangell, with the expectation that the results might spur exploration investment. This area contains several known mineral deposits and is prospective for Greens Creek-type deposits. Barite was formerly mined on Castle Island within the survey area. The contract was awarded to WGM-Dighem, and DGGS managed the contract to conform to the State-sponsored surveys elsewhere. Results of the survey were released in Wrangell and Fairbanks on September 22, 1997.

At the Greens Creek Mine, Kennecott completed 90,000 feet of exploratory drilling in 1997 at the mine site, and Kennecott Exploration also had a regional program for polymetallic deposits in southeastern Alaska, including the area around Wrangell.

Coeur Alaska Inc. continued to map and sample the Kensington deposit north of Juneau concomitant with ongoing permitting. Regional exploration was also reported by Rio Algom Exploration Inc., Sealaska Corp., and Hyak Mining Co.

Grizzly Bar Development LLC explored for placer gold at the Grizzly Bar on the Taku River south of Juneau, and both the Foster Operation and Snow Lion Mining continued exploration at their placer operations on Porcupine Creek near Haines. There was renewed interest in the rare-earth veins on Bokan Mountain near the old Ross-Adams uranium mine (fig. 7).



Figure 7. Jules Tileston and Bruce Campbell at the 300-foot level of the Ross-Adams uranium mine, Bokan Mountain, southeastern Alaska. Photo by Jan Nauman.

DEVELOPMENT

Table 7 shows reported development expenditures by region in 1997, and table 8 shows cumulative development expenditures since 1982. Figure 8 shows the locations of selected development projects. The \$168.4 million expended in 1997 is down considerably from the \$394.0 million spent in 1996 because the Illinois Creek gold mine near Galena and the Fort Knox gold mine near Fairbanks became operational, and the Greens Creek Mine near Juneau had reached full productivity.

NORTHERN REGION

The \$133.9 million development expenditure reported at the Red Dog Mine and port site are part of the production rate increase (PRI) project that began in 1996. The project is designed to allow a 35 percent increase in production which will be phased in beginning in early summer of 1998. Cominco Alaska Inc. funded the developments at the mine site, and the State of Alaska funded the upgrade of the port facilities through the Alaska Industrial Development and Export Authority (AIDEA).

At the port site, the original 1.2 million gallon fuel storage tank was moved to the mine, and a new 2.4 million gallon tank constructed. The accommodations

and ancillary facilities were expanded, and the concentrate storage and load-out facilities increased (fig. 9).

At the mine site an additional drill, Caterpillar tractor, loader, and truck were added to the fleet and at the mill a new 42-inch gyratory crusher was added, the ore storage facility modified, and the grinding and recovery systems upgraded. A fifth wing with 80 additional rooms was added to the accommodations complex.

About 800 people were on site in 1997, including the regular workforce of about 479.

Cominco also completed 25,000 feet of development drilling in the area of the main pit and 205,000 feet of blast-hole drilling.

WESTERN REGION

Expenditures in this region in 1997 were \$12.6 million, only about 38 percent of the \$32.6 million in 1996.

Alaska Gold Co. continued its open-pit operation at Nome, and the 1997 program included a 17,000-foot churn-drill program to develop reserves. Several of the smaller placer mines on the Seward Peninsula also reported some development work including stripping the overburden from the pay gravel, constructing roads and ponds, and reclamation.

Table 7. Reported mineral development expenditures and employment in Alaska by commodity and region, 1997

	Northern	Western	Eastern interior	South-central	South-eastern	Total
Development expenditures						
Base metals	\$133,880,000	\$ --	\$ --	\$ --	\$ --	\$133,880,000
Polymetallic	--	--	--	--	7,300,000	7,300,000
Precious metals						
Placer	--	540,000	250,000	49,000	8,000	847,000
Lode	--	12,100,000	5,852,000	--	7,500,000	25,452,000
Coal and peat	--	--	310,000	100,000	--	410,000
Industrial minerals	--	--	100,000	--	400,000	500,000
TOTAL	\$133,880,000	\$12,640,000	\$6,512,000	\$149,000	\$15,208,000	\$168,389,000
Development employment						
Employment						
Workdays	72,240	13,588	5,357	450	14,566	106,201
Workyears ^a	278	52	21	2	56	409
Number of companies reporting ^b	2	5	14	4	5	30

-- No expenditures reported.

^aBased on 260-day workyear.

^bSome companies active in more than one area.

Table 8. Reported mineral development expenditures in Alaska by commodity, 1982–97

	Base metals	Polymetallics	Precious metals	Industrial minerals	Coal and peat	Total
1982	\$ 10,270,000	\$ N/A	\$ 19,320,000	\$ 4,251,000	\$ 7,750,000	\$ 41,591,000
1983	19,500,000	N/A	7,112,500	1,000,000	250,000	27,862,500
1984	10,710,500	N/A	15,058,555	579,000	27,000,000	53,348,055
1985	13,000,000	N/A	16,890,755	1,830,000	2,400,000	34,120,755
1986	3,260,800	8,000,000	12,417,172	124,000	530,000	24,331,972
1987	38,080,000	48,000,000	13,640,848	188,000	342,000	100,250,848
1988	165,500,000	69,000,000	40,445,400	—	—	274,945,400
1989	118,200,000	411,000	6,465,350	7,000,000	2,196,000	134,272,350
1990	—	4,101,000	7,136,500	30,000	3,079,000	14,346,500
1991	—	8,000,000	14,994,350	262,000	2,318,000	25,574,350
1992	80,000	4,300,000	23,151,300	404,000	1,655,000	29,590,300
1993	—	10,731,136	15,103,000	433,500	1,400,000	27,667,636
1994	10,000,000	5,000,000	27,392,850	5,000	2,545,000	44,942,850
1995	11,200,000	9,590,000	127,165,750	426,000	200,000	148,581,750
1996	60,000,000	60,100,000	273,042,000	495,000	400,000	394,037,000
1997	133,880,000	7,300,000	26,299,000	500,000	410,000	168,389,000
TOTAL	\$593,681,300	\$234,533,136	\$645,635,330	\$17,527,500	\$52,475,000	\$1,543,852,266

N/A = Figures not available prior to 1986.

— = Not reported.

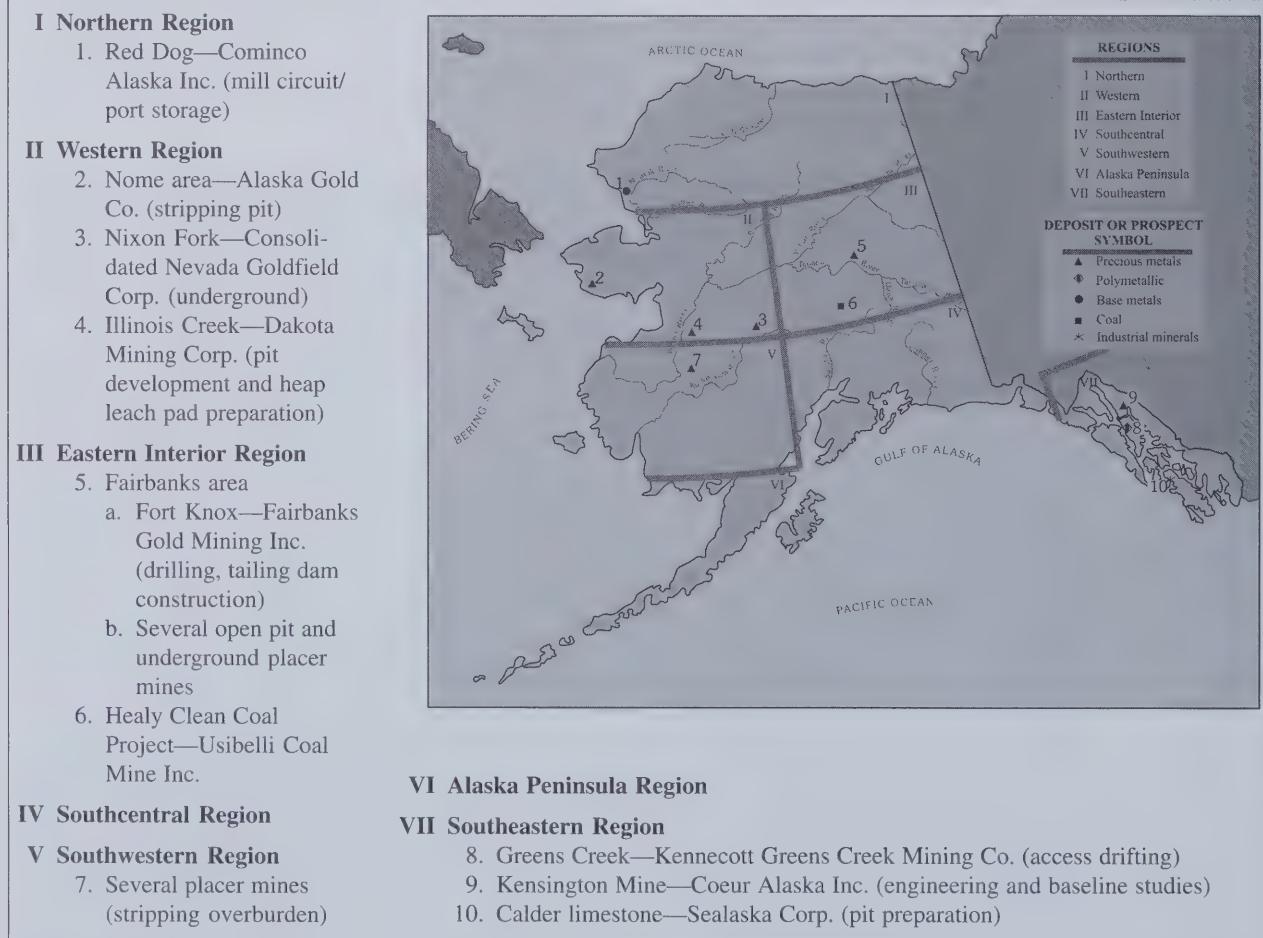


Figure 8. Selected mineral development projects in Alaska, 1997.

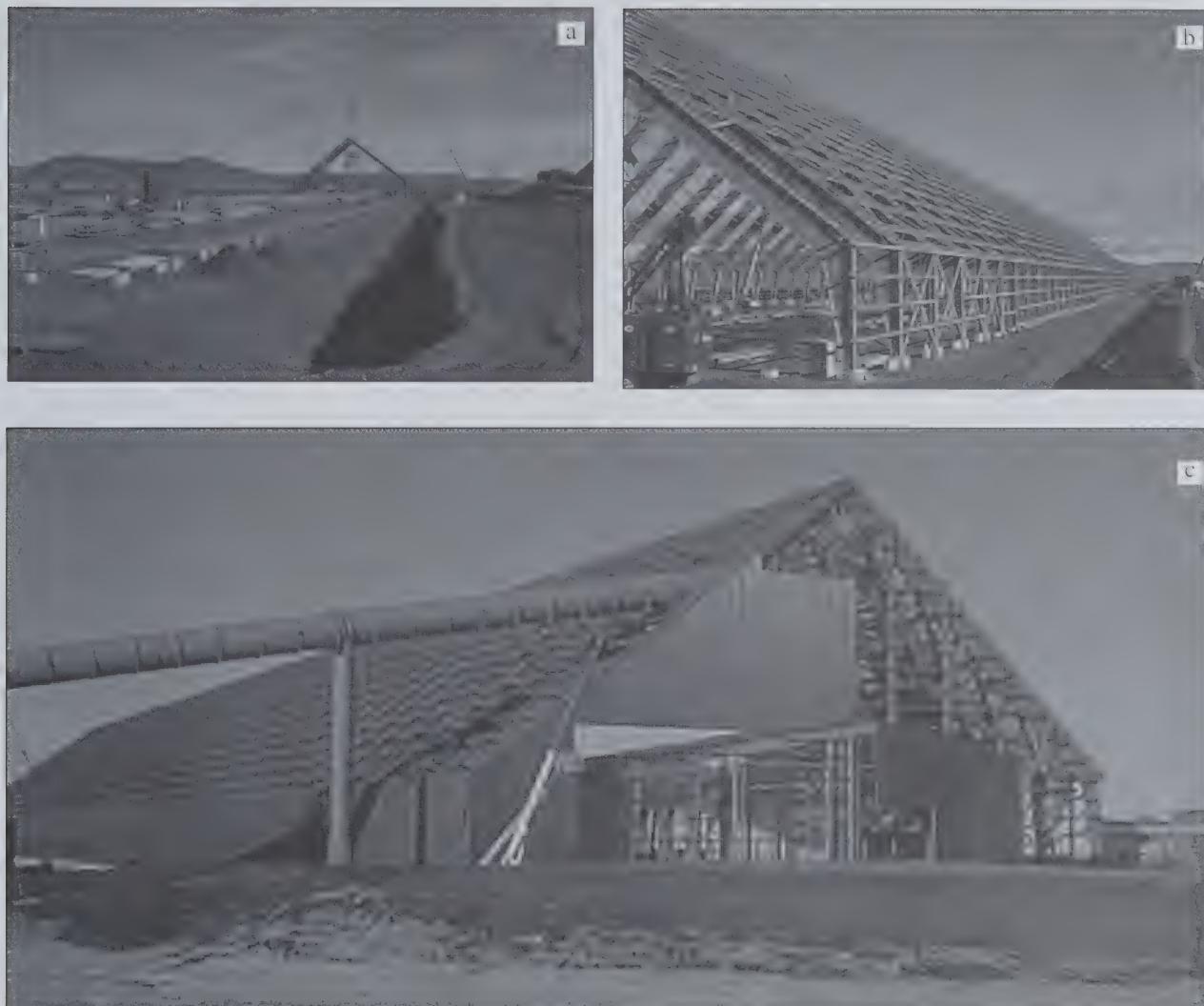


Figure 9. Stages in the development of the new zinc concentrate storage building at the Red Dog port site south of Kivalina—(a) initial earthwork, July; (b) structured steel, September; and (c) roofed in November 1997. Note wash bay for vehicles. The building is 1,200 feet long, 118 feet wide, and 125 feet high, and can store 450,000 tons of zinc concentrate. Photos by John Wood.

At Dakota Mining Co.'s Illinois Creek gold-silver mine south of Galena, construction continued; by mid year the project had evolved into a production facility.

Consolidated Nevada Goldfields continued development of its Nixon Fork gold-copper mine near McGrath, driving almost 3,500 feet of 10 foot by 14 foot decline to access the deeper orebodies.

EASTERN INTERIOR REGION

The only major metal development in this region was at the Fort Knox gold mine where work continued on the tailings dam and some modifications were made to the leach tanks. An in-pit drilling program of 38,000 feet was completed, resulting in an addition of approximately 450,000 ounces to the reserve base in 1997.

Many of the small placer mines reported development of their properties, generally consisting of stripping and thawing ground in preparation for mining, and construction of settling ponds, roads and other facilities. Mines reporting development in the Rampart-Manley area include Bed Rock Enterprises (Killarney Creek); Kelley Mining Co. (Manley area); and Slate Creek Mining Co. on Slate Creek. In the Circle area KMM (Faith Creek), Paul & Co. (Bonanza Creek) and Underwood Mining Co. (Bonanza and Porcupine creeks) all reported stripping overburden. A.M. Mining Ltd. (Dome Creek) and Tillicum Resources Inc. (Fox) both reported development in the Fairbanks district. In the Forty-mile area Harvey Bickell (Walker Fork), Scott Reed (North Fork), Hayden Exploration & Mining (KAL Creek near Eagle), EBP

(Smith Bench), and 45-Pup Mining all reported overburden removal.

COAL

Usibelli Coal Mine Inc. drilled 2,658 feet of reverse-circulation drill holes to develop its Poker Flats lease, and 2,800 feet at the Two Bull Run lease.

INDUSTRIAL MINERALS

Globe Creek Mining Inc. prepared its Globe Creek limestone operation for mining and constructed road access to the haul road.

SOUTHCENTRAL REGION

Lake Creek Placers reported ground preparation at its Lake Creek gold placer mine, and Middle Fork Mine stripped overburden at its Ruby Gulch property.

Nerox Power Systems Inc. began preparation of the portal at the Jonesville coal mine east of Palmer with the intent of mining about 550,000 tons per year in the next few years.

SOUTHEASTERN REGION

About \$15.2 million was invested in this region in 1997 on development projects at the Kensington, Alaska-Juneau (A-J) and Greens Creek mines, and at the Calder Island limestone quarry.

Coeur Alaska continued its permitting process for the Kensington Mine. In August the U.S. Forest Service approved the Final Supplemental Environmental Impact Statement, and signed the Record of Decision. The City & Borough of Juneau approved the Large Mine Permit in early November, leaving only the Corps of Engineers 404, the EPA discharge, and the State DEC Solid Waste permits to be approved.

At the Greens Creek mine, Kennecott reported 30,000 feet of development drilling concomitant with the ongoing exploration project.

Kvaerner Environmental began the reclamation of the A-J Mine in preparation for the ultimate closure.

Sealaska Corp. began preparation of its Calder Island chemical-grade limestone quarry, and started the design for the terminal facility.

PRODUCTION

The total 1997 value of production in Alaska, \$936.2 million, was up 59 percent from the \$590.4 million in 1996. With the commissioning of the Fort Knox and Illinois Creek gold mines, and full production at the Greens Creek polymetallic mine, there was an increase in the amount of gold and silver production in 1997, and production of lead and zinc increased slightly at the Red Dog Mine. These factors, coupled with higher average prices for zinc than in 1996, led to a much higher value of base and precious metals for 1997.

Table 9 shows the quantity and value for the metals and materials produced from 1995 to 1997. Figures 10, 11, and 12 show the historic production of sand and gravel, gold, and coal.

Table 10 shows the metal mines reporting production or identified by the Division of Mining & Water Management as producers by region, mining district, and by type. In a departure from past reports, only selected mines in the districts will be discussed in text.

Zinc, with a value of \$495 million, is by far the most important commodity produced, representing 53 percent of the total, followed a distant second by gold, with a value of \$207 million, representing 22 percent of the total. These are followed by silver (\$71 million, 8 percent), sand and gravel (\$52 million, 6 percent), lead (\$50 million, 5 percent), coal (\$38 million, 4 percent), and rock (\$20 million, 2 percent).

Zinc and lead production was from the Red Dog Mine near Kotzebue and the Greens Creek Mine near Juneau;

copper was from the Greens Creek Mine near Juneau and the Nixon Fork Mine near McGrath; silver was produced at Red Dog, Greens Creek, and Illinois Creek; and gold production was from Greens Creek, Nixon Fork, Illinois Creek, Fort Knox, and 114 placer gold mines. Figure 13 shows the location of selected mines.

These production estimates for 1997 were compiled from 194 DGGs questionnaires returned from Native corporations, mine operators, agencies, and municipalities, supplemented by about 60 phone surveys. The Alaska Placer Mining Applications (APMAs) were used to cross-check for missing information, but the authors were unable to contact some operators, so the placer mine production is of necessity a conservative value. The authors particularly wish to thank the State Department of Transportation & Public Facilities and the Department of Natural Resources Divisions of Mining & Water Management and of Land for their assistance in securing as much information as possible.

About half of the respondents provided costs and unit values for their commodities, but the metal values were computed from the weekly averages on the London Exchange, and the values reported in table 9 do not take into account mining, shipping, smelting, or other costs incurred by the reporting company.

It is of interest that in 1997, for the first time in over 50 years, hardrock gold production (481,439 ounces) exceeded placer gold production (109,077 ounces) and

Table 9. *Estimated mineral production in Alaska, 1995–97^a*

Metals	Quantity			Estimated values ^b		
	1995	1996	1997	1995	1996	1997
Gold (ounces)	141,882	161,565	590,516	\$ 56,043,390	\$ 62,622,594	\$207,287,000
Silver (ounces)	1,225,730	3,676,000	14,401,165	6,655,714	19,078,440	70,710,000
Copper (tons)	NR	390	1,720	NR	803,400	3,543,000
Lead (tons)	58,530	70,086	88,560	34,428,600	52,284,000	49,593,000
Zinc (tons)	359,950	366,780	419,097	345,552,000	361,646,000	494,888,000
Subtotal				\$442,679,704	\$496,434,434	\$826,021,000
Industrial minerals						
Jade and soapstone (tons)	2.0	2.0	2.0	\$ 25,000	\$ 25,000	\$ 25,000
Sand and gravel (million tons)	9.8	9.9	13.8	30,886,821	32,203,260	51,913,000
Rock (million tons)	2.8	3.0	3.2	22,163,703	23,557,637	20,000,000
Subtotal				\$ 53,075,524	\$ 55,785,897	\$ 71,938,000
Energy minerals						
Coal (tons)	1,670,000	1,481,000	1,446,000	\$ 41,300,000	\$ 38,000,000	\$ 38,048,000
Peat (cubic yards)	35,000	38,000	38,500	157,500	175,000	192,000
Subtotal				\$ 41,457,500	\$ 38,175,000	\$ 38,240,000
TOTAL				\$537,212,728	\$590,395,331	\$936,199,000

^aProduction data from DGGS questionnaires, phone interviews with mine and quarry operators, Alaska Department of Transportation and Public Facilities, and federal land management agencies.

^bValues for selected metal production based on average prices for each year; for 1997—gold (\$330.76/ounce) unless other value provided by operator; silver (\$4.91/ounce); copper (\$1.03/lb); zinc (\$0.59/lb); lead (\$0.28/lb). All other values provided by mine operators. Value rounded to nearest \$1,000.

NR = None reported.

Table 10. *Companies and individuals reported to be producing metal in Alaska in 1997*

District	Operator	Creek/Mine	Type
NORTHERN REGION			
Noatak	Cominco Alaska Inc.	Red Dog Mine	O/P H/R Zinc-Lead-Silver
Chandalar	Gold Dust Mines Inc.	Little Squaw	O/P Placer
Koyukuk-Nolan	Paradise Valley Mining	Birch	O/P Placer
Koyukuk-Nolan	Lounsbury Mining Inc.	Union Gulch	O/P Placer
Koyukuk-Nolan	Don Wiggers	Hammond River	O/P Placer
WESTERN REGION			
Kaiyuh	Dakota Mining Corp.	Illinois Creek Mine	O/P H/R Gold-Silver
Cape Nome	Alaska Gold Co.	Nome submarine beach	O/P Placer
Cape Nome	Betty Krutzch	Basin	O/P Placer
Cape Nome	Bert Pettigrew	Anvil	O/P Placer
Cape Nome	Alfred Turner	Center	O/P Placer
Cape Nome	Steve Pomrenke	Tripple	O/P Placer
Cape Nome	High Bench Mining	Nekula Gulch	O/P Placer
Cape Nome	Perry Massie	Cripple	O/P/Placer
Cape Nome	Dave Olson	Canyon	O/P Placer
Cape Nome	John Walsh	Mystery	O/P Placer
Port Clarence	William Bartholomae	Gold Run	O/P Placer
Fairhaven	Layne Gardner	Bear, Gold Run	O/P Placer

Table 10. *Companies and individuals reported to be producing metal in Alaska in 1997—continued*

District	Operator	Creek/Mine	Type
Kougarok	N. B. Tweet & Sons	Kougarok	O/P Placer
Kougarok	Lohman Mining	Coffee	O/P Placer
Kougarok	A & L Mining	Coffee	O/P/Placer
Kougarok	Cheryl Jong	Washington	O/P Placer
Kougarok	Richard Redmond	Macklin	O/P Placer
Kougarok	Mark Gumaer	Dick	O/P Placer
Candle	Mike Vial	Mud	O/P Placer
Candle	Dave Vial	Candle	O/P Placer
Candle	Alan Olson	Candle	O/P Placer
Ruby	Conrad House	Swift	O/P Placer
McGrath	Consolidated Nevada Goldfields Inc.	Nixon Fork Mine	U/G H/R Gold-Copper-Silver
McGrath	Manzie Magnuson	Candle	O/P Placer
Innoko	Rosander Mining	Colorado	O/P Placer
Hughes	Taiga Mining Co. Inc.	Dry	O/P Placer
EASTERN INTERIOR REGION			
Hot Springs	Salter & Associates Inc.	Doric	O/P Placer
Hot Springs	Rick Swenson	Doric	O/P Placer
Hot Springs	Ross Novak	Eureka	O/P Placer
Hot Springs	Ross Novak	American	O/P Placer
Hot Springs	Ernest Johnson	Glen	O/P Placer
Hot Springs	Jay Hodges	American	O/P Placer
Hot Springs	James Wood	Little Boulder	O/P Placer
Hot Springs	Placer Mine Services	Boulder	O/P Placer
Hot Springs	Terry Russell	Ready Money	O/P Placer
Hot Springs	Jack Neuebauer	Tofty-Woodchopper	O/P Placer
Rampart	Frank Willford	Hoosier Tributary	O/P Placer
Rampart	Steve Losonsky	Hunter	O/P Placer
Rampart	Don Harris	Slate	O/P Placer
Melozitna	Wayne Gibson	Golden	O/P Placer
Tolovana	Alaska Placer Development	Livengood	O/P Placer
Tolovana	Samuel Eaves	Warwick Gulch	O/P Placer
Fairbanks	Fairbanks Gold Mining Inc	Fort Knox Mine	O/P H/R Gold
Fairbanks	Polar Mining Inc.	Goldstream	O/P Placer
Fairbanks	Yellow Eagle Mining Co.	Cripple	O/P Placer
Fairbanks	Gerald Hassel	Ready Bullion	O/P Placer
Fairbanks	Roger Moore	Seattle Bench	O/P Placer
Fairbanks	S.D.C. Mining	Dome	O/P Placer
Fairbanks	A.M. Mining Ltd.	Dome	O/P Placer
Fairbanks	Lucky-7 Mining	Last Chance	O/P Placer
Fairbanks	Cook's Mining	Lower Fairbanks	O/P Placer
Fairbanks	Alf Hopen	Cleary	O/P Placer
Fairbanks	Don Read	Vault	O/P Placer
Fairbanks	Andy Miscovich	Chatham	O/P Placer
Fairbanks	Tillicum Resources Inc.	Fox	O/P Placer
Fairbanks	KMM Co.	Faith	O/P Placer
Fairbanks	John Hannah	Moose/Pedro/Flume	O/P Placer
Fairbanks	Robert Wright	Last Chance	O/P Placer
Fairbanks	Chris Groppel	Tenderfoot	O/P Placer
Fairbanks	Earl Voytilla	Tenderfoot	O/P Placer
Fairbanks	John Rubel	Banner	O/P/Placer
Fairbanks	AU Mining	Chatanika/Cleary	U/G Placer
Fairbanks	Little Eldorado Group	Little Eldorado	U/G Placer
Circle	Shorti-Jack Mining	Eagle	O/P Placer
Circle	Steve Olson	Eagle	O/P Placer
Circle	Paul and Company	Bonanza	O/P Placer
Circle	Douglas Miller	Bonanza	O/P Placer
Circle	Aurora Mining	North Fork Harrison	O/P Placer

Table 10. Companies and individuals reported to be producing metal in Alaska in 1997—continued

District	Operator	Creek/Mine	Type
Circle	Richard Loud	North Fork Harrison	O/P Placer
Circle	Lapp and Sons	Ketchum	O/P Placer
Circle	Arctic Mining	Crooked	O/P Placer
Circle	Dan Mandrones	Crooked	O/P Placer
Circle	Rock Laundry Mining	Crooked	O/P Placer
Circle	Willis Mine Services	Crooked	O/P Placer
Circle	Stan Gelvin	Crooked	O/P Placer
Bonnifield	Tim Kiehl	Gold King	O/P Placer
Bonnifield	TruDeck Mining	Sheep	O/P Placer
Bonnifield	Robert Keller	Totatlanika	O/P Placer
Bonnifield	Roy Traxler	Totatlanika	O/P Placer
Bonnifield	Ralph Simonson	Surprise	O/P Placer
Bonnifield	David Jacobs	Rex	O/P/Placer
Bonnifield	Wayne Tachick	Moose	O/P Placer
Bonnifield	Tom Faaf	Moose	O/P Placer
Bonnifield	Glen Parr	Little Moose	O/P Placer
Fortymile	Harvey Bickell	Walker Fork Fortymile	O/P Placer
Fortymile	Fred Heflinger	Walker Fork Fortymile	O/P Placer
Fortymile	Double J Mining	Napoleon	O/P Placer
Fortymile	Brad Carr	South Fork Fortymile	O/P Placer
Fortymile	Walter Schofield	South Fork Fortymile	O/P Placer
Fortymile	Roger Tallini	South Fork Fortymile	O/P Placer
Fortymile	Taylor's Mining	Fortymile	O/P Placer
Fortymile	James Treesh	Fortymile	O/P Placer
Fortymile	Jensen Mining & Construction	McCumber	O/P Placer
Fortymile	45 Pup Mining	45 Pup	O/P Placer
Fortymile	Scott Reed	North Fork Fortymile	O/P Placer
Fortymile	Guy Fichtelman	Mosquito Fork	O/P Placer
Fortymile	Leo Regner	Lilliwig	O/P Placer
Fortymile	Hayden Exploration & Mining	Squaw (KAL)	O/P Placer
Fortymile	Geo Quest	Chicken	O/P Placer
SOUTHCENTRAL REGION			
Yentna	Lake Creek Placers	Lake Creek	O/P Placer
Willow Creek	Mrak Placer Mine	Willow	O/P Placer
Tok	Middle Fork Mine	Middle Fork Chistochina	O/P Placer
Hope	Outsider Mining	Canyon	O/P Placer
Hope	Gerald Willard	Bear	O/P/Placer
Anchorage	Girdwood Mining Co.	Crow	O/P Placer
SOUTHWESTERN REGION			
Marshall	Chase Brothers Mining	Flat/Stuyahok	O/P Placer
Innoko	Clarke-Wiltz Partnership	Podesie/Ganes	O/P Placer
Innoko	Anderson Mining	Yankee	O/P Placer
Innoko	Little Creek Mine	10 Pup/Little	O/P Placer
Innoko	Ed Plano	Anvil Gulch	O/P Placer
Innoko	Manzie Magnuson	Madison	O/P Placer
Iditarod	Chicken Creek Mining	Chicken	O/P Placer
Iditarod	Flat Creek Mining Co.	Flat	O/P Placer
Aniak	Mark Matter	Marvel	O/P/Placer
Aniak	Nyac Mining Inc.	Bear	O/P Placer
SOUTHEASTERN REGION			
Juneau	Big Nugget Mining	Porcupine	O/P Placer
Juneau	Snow Lion Mining	Porcupine	O/P Placer
Admiralty	Kennecott/Hecla	Greens Creek Mine	U/G H/R Zinc-Lead-Gold-Silver

SOURCE: Questionnaires and mine visits by Division of Mining & Water Management.

O/P = open pit; U/G = underground; H/R = hard rock.

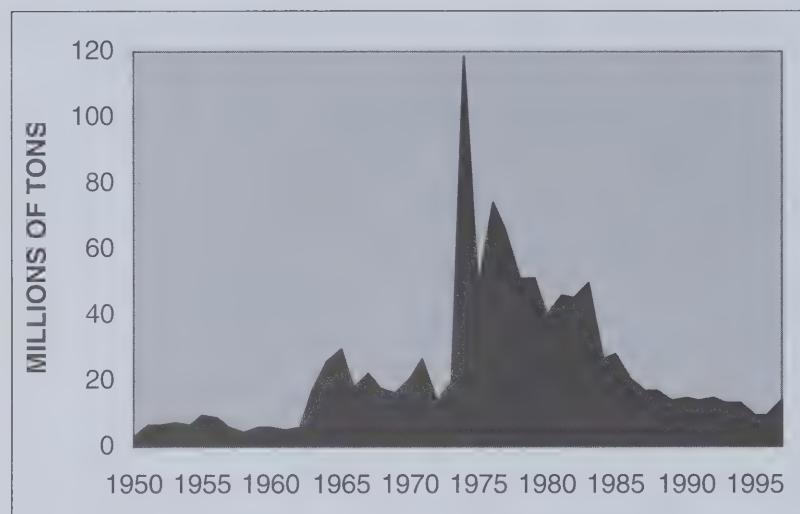


Figure 10. Sand and gravel production in Alaska, 1950–97.



Figure 11. Amount and value of gold production in Alaska, 1880–1997.

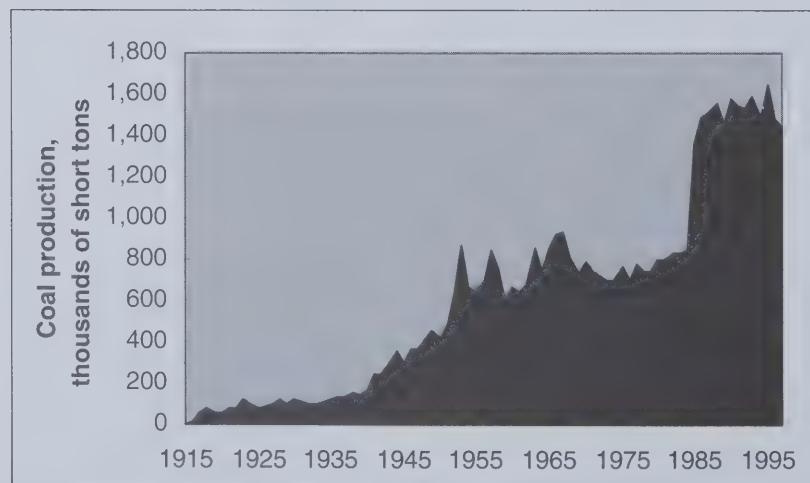


Figure 12. Coal production in Alaska, 1915–97.

this situation is expected to continue for the foreseeable future. Table 11 shows the relative importance of the six regions of Alaska where gold production was reported, and table 12 shows the production costs for small (less than 650 ounces production), medium (650 to 2,500 ounces), and large (over 2,500 ounces) gold operations. It should be noted that reported production costs vary widely within the groups, and that companies reporting costs are too few to be statistically meaningful.

Tables 13 and 14 show the amount and value of sand, gravel, and rock reportedly used in 1997 in the seven regions of the state. By far the greatest use of these materials is in road construction and maintenance.

The total value of sand and gravel in 1997 was \$51.9 million for 13.8 million tons. The majority of sand and gravel used was in the southcentral region of the state on reconstruction projects on the Parks, Glenn, and Seward highways, but completion of the Geist Road overpass and other roadwork in the Eastern interior region, and oilfield and road construction in the northern region contributed to the higher-than-normal use of these materials.

Virtually all of the 3.2 million tons of rock used in the state was for construction material in southeastern Alaska, mainly for road maintenance in the Tongass National Forest and some of the municipalities, and as fill material for the ferry terminal site near Juneau. The total value is estimated to be \$20 million, based on the values per ton reported by several private vendors.

Coal production in 1997 was slightly less than in 1996, with 650,000 tons shipped to Korea and the remainder sold to interior Alaska power plants. A new 50-megawatt mine-mouth clean coal power plant is scheduled to burn about 300,000 tons of coal when it is running at full production in 1999. Production of peat was up slightly in 1997, mostly for use in local horticulture.

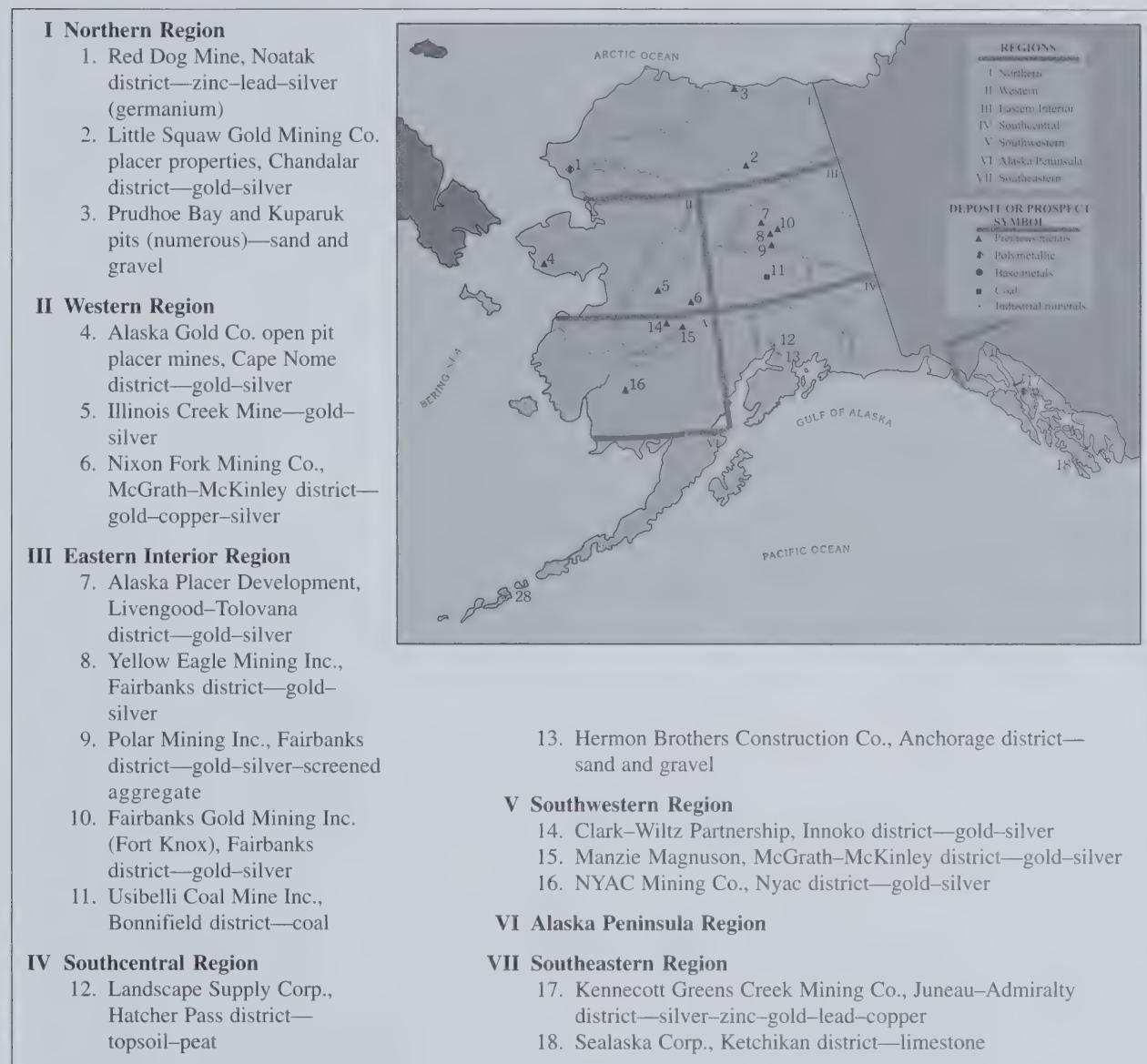


Figure 13. Selected production projects, 1997.

Table 11. Reported refined gold production, number of operators, and industry employment in Alaska, 1995–97^a

Region	Number of operators			Production in ounces of gold			Number of employees		
	1995	1996	1997	1995	1996	1997	1995	1996	1997
Northern	6	5	4	6,265	1,450	537	58	14	12
Western	25	24	24	38,100	74,200	104,297	261	338	324
Eastern Interior	89	92	75	53,690	74,789	423,676	376	456	548
Southcentral	10	8	6	35,094	3,100	971	232	16	12
Southwestern	13	13	11	8,548	8,500	5,070	80	80	57
Southeastern	2	3	3	185	8,026	55,965	6	69	277
TOTAL	145	145	123	141,882	170,065	590,516	1,013	973	1,230

^a1997 production includes 481,439 ounces gold from Nixon Fork, Illinois Creek, Fort Knox, and Greens Creek hardrock projects, and 109,077 ounces of placer gold.

Table 12. *Production costs for selected Alaska placer gold mines, 1991–97*

Mine size	1991	1992	1993	1994	1995	1996	1997
Number of mines							
Small ^a	21	23	19	24	11	9	25
Medium ^b	8	6	4	6	5	5	6
Large ^c	5	5	2	4	4	4	4
TOTAL	34	34	25	34	20	18	35
Production in ounces							
Small ^a	3,582	3,842	3,919	2,789	1,459	1,433	5,077
Medium ^b	8,431	5,759	5,825	7,471	5,890	5,058	9,373
Large ^c	84,539	128,992	25,335	48,864	43,390	49,240	65,682
TOTAL	96,552^d	138,593^e	35,079^f	59,124^g	50,739^h	55,731ⁱ	80,132^j
Total reported mine costs							
Small ^a	\$ 1,018,606	\$ 940,000	\$ 1,031,500	\$ 989,076	\$ 336,300	\$ 389,754	\$1,243,865
Medium ^b	2,518,239	1,460,000	1,905,125	2,597,782	1,440,000	1,222,700	1,696,513
Large ^c	31,857,228	41,650,000	7,605,000	16,706,600	14,795,000	17,159,024	21,018,240
TOTAL	\$35,394,073	\$44,050,000	\$10,541,625	\$20,293,458	\$16,571,300	\$18,771,478	\$23,958,618
Unit cost per ounce							
Small ^a	\$284	\$245	\$263	\$354	\$231	\$271	\$245
Medium ^b	298	255	327	347	245	242	181
Large ^c	376	322	300	341	341	348	320
TOTAL	\$367	\$318	\$300	\$343	\$327	\$337	\$299

^a10–650 oz gold/yr.^b650–2,500 oz gold/yr.^c>2,500 oz gold/yr.^d46% of total Alaska placer gold production.^e61% of total Alaska placer gold production.^f19% of total Alaska placer gold production.^g32% of total Alaska placer gold production.^h37% of total Alaska placer gold production.ⁱ56% of total Alaska placer gold production.^j73% of total Alaska placer gold production.Table 13. *Reported sand and gravel production and industry employment in Alaska by region, 1997*

Region	Companies and agencies reporting ^a	Tons	Estimated unit value (\$/ton) ^b	Total value	Estimated number of employees
Northern	4	1,573,045	\$ 4.50	\$ 7,078,703	70
Western	2	242,000	4.50	1,089,000	30
Eastern Interior	9	2,399,900	4.00	9,599,600	195
Southcentral	12	8,370,440	3.50	29,296,540	310
Southwestern	2	368,000	2.26	831,680	30
Alaska Peninsula	3	72,000	2.66	191,520	20
Southeastern	7	728,706	5.25	3,825,706	45
TOTAL	39	13,754,091	3.77	\$51,912,749	700

^aFrom 31 returned questionnaires and 8 phone canvass responses.^bValues are based on price and cost estimates from 17 producers.

NORTHERN REGION

METALS

One hardrock open-pit mine and four conventional placer mines reported production in 1997 in this region. Placer production is shown in table 11.

The Red Dog zinc-lead-silver mine, owned by NANA Corp. and operated by Cominco Alaska Inc., produced 675,900 short dry tons of 55.2 percent zinc concentrate and 123,500 short dry tons of 56.1 percent lead concentrate from 2,127,000 tons of ore milled. Average grades of the mill-feed were 20.3 percent zinc, 5.2 percent lead and 2.9 ounces per ton silver. Operating profit for 1997 was \$102 million compared with \$25 million in 1996. Table 15 and figure 14 show production statistics for the past 8 years.

INDUSTRIAL MINERALS

Tables 12 and 13 show the use of sand, gravel, and rock in the various regions of the state in 1997.

Sand and gravel production in the northern region, 1.57 million tons, was similar to the 1.51 million tons produced in 1996.

A substantial quantity of sand and gravel was used by the North Slope Borough for roadwork and facilities, by British Petroleum and Arco for their oilfield facilities, and lesser amounts at the Red Dog Mine. About 30,000 tons of shot rock was also used at the mine. Most of the material, as well as that used by the Department of Transportation & Public Facilities for airport upgrades, was derived from sales by DNR's Division of Land.

Table 14. Reported stone production and industry employment in Alaska by region, 1997^a

Region	Companies and agencies reporting ^b	Tons	Estimated unit value (\$/ton) ^c	Total value	Estimated number of employees
Northern	2	20,000	\$10.00	\$ 200,000	5
Western	2	32,000	10.00	320,000	10
Eastern Interior	3	60,220	10.00	602,200	15
Southcentral	3	94,400	7.50	708,000	15
Southwestern	--	--	--	--	--
Alaska Peninsula	1	13,500	10.00	135,000	3
Southeastern	4	2,956,338	6.10	18,033,661	75
TOTAL	15	3,176,458	6.30	\$19,998,861	123

^aIncludes shot rock, crushed stone, D-1, riprap, and modest quantities of ornamental stone.

^bDerived from 9 questionnaires, 6 phone canvass responses.

^cUnit value based on data supplied by 10 operations. Unit values for different stone products vary widely.

-- Not reported.

Table 15. Cominco Alaska's Red Dog Mine, production statistics, 1990-97

	1990	1991	1992	1993	1994	1995	1996	1997
Ore milled (tons)	996,700 ^a	1,599,300	1,582,000	1,874,600 ^a	2,339,500	2,485,900	2,312,600	2,127,000
Ore grade								
Zinc	26.5%	22.5%	19.9%	18.4%	18.8%	19.0%	18.7%	20.3%
Lead	8.5%	6.6% ^a	6.0%	5.7% ^a	5.7%	5.8%	5.0%	5.2%
Silver (oz/ton)	3.6 ^a	2.8	2.9	2.8	2.8	2.8	2.8	2.87
Concentrate								
Zinc (tons)	337,400	410,700	405,900	465,600	588,100	645,100	646,800	675,900
(grade)	56.9% ^a	57.1%	57.0%	54.8%	55.8%	55.6%	55.3%	55.2%
Lead (tons)	56,600 ^a	76,600 ^a	28,000	48,700	59,700	101,300	118,500	123,500
(grade)	55.1%	57.2%	57.0%	50.9%	54.9%	55.0%	55.6%	56.1%
Silver Mill Recovery	--	--	--	--	--	53%	66.9%	70%
(million ounces)	--	--	--	--	--	3.615	4.304	4.273
Total								
concentrate (tons)^b	443,600	521,400	474,900	539,800	658,000	753,600	765,300	799,400
Employees	350	331	349	376^a	311	397	417	478

^aRevised slightly from Bundtzen and others (1996) based on new company data.

-- = No data.

^bTotals for years 1990 through 1995 include bulk concentrate.

SOURCE: Gary Coulter and Jim Kulas, Cominco Alaska Inc.

WESTERN REGION

METALS

Two hardrock gold mines and 22 placer gold mines in the western region produced a total of 104,297 fine ounces of gold in 1997; 44,986 ounces of that total were placer gold.

Alaska Gold Co. continued open-pit placer gold mining of the submarine beach west of Nome (fig. 15), producing 28,200 ounces from 870,000 cubic yards of pay gravel. The mine employs 70 people, and is a typical open-pit operation. Some of the Alaska Gold Co. properties were leased to other operators.

About 40 miles south of Galena the Illinois Creek lode gold-silver mine poured its first gold in June. This mine is operated by Dakota Mining Corp., with a 5 percent net smelter interest held by Cook Inlet Region Inc., a Native corporation formed during land title settlements in 1971. Although most of the concerns voiced during permitting regarded whether the valley-fill leach would overflow, a near drought throughout the summer (and fires bigger than those in Indonesia) prevented Dakota Mining Corp. from sufficiently watering the heap. By September, the flow to the heap was at 90 percent of the predicted rate, and by year end 1.35 million tons of rock averaging 0.072 ounces of

gold per ton was on the pad. Dakota produced about 20,111 ounces in 1997, expects to produce about 80,000 ounces in 1998, and expects to average about 65,000 ounces per year for the next 5 years.

At the Nixon Fork gold-copper skarn mine near McGrath, Consolidated Nevada Goldfields produced 39,666 ounces of gold and 420 tons of copper in concentrates. The concentrates are flown out from the mine to Palmer for shipment to the Dallo Inc. smelter in Kosaka, Japan.

INDUSTRIAL MINERALS

Cape Nome Products, a new joint venture between Sound Quarry Inc. and Knik Construction, mined 30,000 tons of rock from the granitic orthogneiss quarry at Cape Nome east of the town of Nome.

EASTERN INTERIOR REGION

METALS

In addition to gold produced at the Fort Knox gold mine, 73 placer mines reported recovery of 57,453 fine ounces of gold in 1997 (fig. 16). Some of these, such as Polar Mining's Goldstream operation, Yellow Eagle Mining's Cripple Creek Joint Venture with Exploration Orbite V.S.P.A. Inc, and Alaska Placer Development's

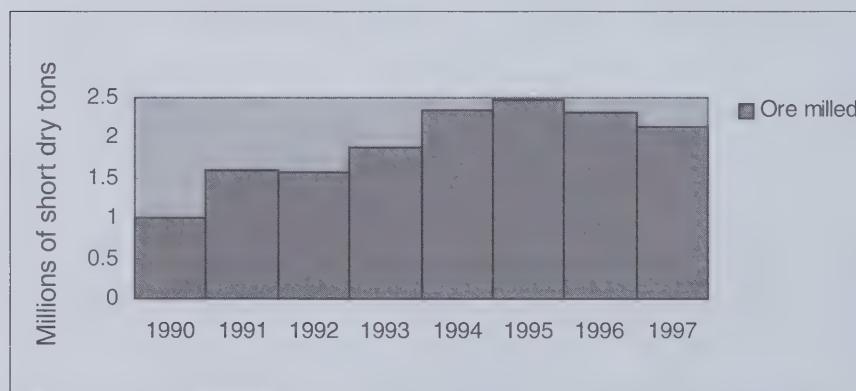


Figure 14. *Ore milled annually at the Red Dog Mine, 1990-97.*



Figure 15. *Alaska Gold Co.'s winter pit, Airport block #1. Photo by John Handeland.*

Livengood operation, are among the largest operations in the state. It is interesting to note that the only underground placer operations in the state are those of AU Mining in the Chatanika Valley near Cleary, north of Fairbanks, and the Little Eldorado Group's operation on the creek of the same name nearby.

With the commissioning of the Fort Knox open-pit hardrock gold mine about 15 miles northeast of Fairbanks, this region became the second most valuable region of the state in 1997. Operated by Fairbanks Gold Mining Inc., a wholly-owned subsidiary of Amax Gold Inc., the first official gold pour at the Fort Knox mine was on December 20, 1996, and the first commercial gold was produced in March 1997. Production through the end of December 1997, including 45,701 ounces of pre-commercial production prior to March 1, was 366,223 ounces, from 11,689,000 tons grading 0.0343 ounces per ton. The cash cost per ounce was \$170, the total production cost was \$342, and the average selling price for all operations worldwide was \$360 per ounce. The 174-million-ton deposit is hosted by a 93-million-year-old multi-phase granitic stock. Gold occurs within northwest-trending quartz vein stockwork associated with minor bismuth and tungsten, and trace sulfides.

COAL AND PEAT

Usibelli Coal Mine Inc. produced 1,446 million tons from its mine near Healy, and exported 650,000 tons to

Korea, with the remainder firing five interior Alaska power plants. One million tons was recovered from its Poker Flats lease, and the remainder from the Gold Run Pass lease. A new 50-megawatt clean coal power plant at the mine mouth has already added power to the Fairbanks–Anchorage intertie. The plant will be in a demonstration mode in 1998, in full production in 1999, and will use up to 300,000 tons of poorer quality coal that is presently discarded.

Peat was produced from pits on College Road in Fairbanks by Great Northwest Inc., and by Exclusive Landscaping & Paving, Inc. from a pit in the Goldstream Valley near Fairbanks.

INDUSTRIAL MINERALS

Production of sand and gravel in the eastern interior region in 1997, 2.4 million tons, was down slightly from the 2.9 million tons used in 1996, as the number of road construction projects continue to decline.

Most of the gravel used in the construction of the Geist Road overpass west of Fairbanks was taken from nearby gravel pits, but some was derived from the washed and screened tailings from local placer mines, particularly Yellow Eagle's Cripple Creek operation.

Yutan Construction Co. produced basalt from its Browns Hill Quarry east of Fairbanks for various purposes, including road sanding by the Department of Transportation during the winter. A small amount of decorative stone was collected from the roadside bluffs at Shaw Creek, about 70 miles southeast of Fairbanks.



Figure 16. Roger Tallini's 8" suction dredge operation, 1997, South Fork Fortymile River. Photo by Roger Tallini.

SOUTHCENTRAL REGION

METALS

The only metal production from this region in 1997 was from six small conventional placer operations, with a total yield of 971 fine ounces, valued at \$321,168.

COAL AND PEAT

Peat production for local horticultural use was reported by several operators in the Matanuska-Susitna Valley, including The Dirt Co. and Landscape Supply Co.

INDUSTRIAL MINERALS

Road construction projects on the Parks Highway near Houston, on the Glenn Highway east of Palmer, and on the Seward Highway along Turnagain Arm and at Moose Pass created a strong demand for both sand and gravel and rock products in 1997. Much of the material used was derived from the rights of way as cut-and-fill, but the 8.4 million tons of sand and gravel used in 1997 was more than double the 3.5 million tons used in 1996. This reflects a shift in recent years in road construction projects to the most populated region of the state.

Private contractors providing sand and gravel in this region include Hermon Brothers Construction Co. from its pit at 1.5 mile on the Palmer–Wasilla Highway; Harris Sand & Gravel Inc. provided material in the Valdez area; Chugach Alaska Corp. mined substantial quantities for Cordova, and also in the Mat-Su Borough; Jackson Construction Co. reported production on the Kenai; and Pate Construction Inc. provided sand and gravel for the Yakutat area.

SOUTHWESTERN REGION

METALS

Metal production in this region in 1997 was an estimated 5,070 fine ounces of gold valued at \$1.68 million derived from 10 placer mines as shown in table 10.

INDUSTRIAL MINERALS

A small amount of gravel and processed gravel was used by the State Department of Transportation & Public Facilities for airport maintenance in this region in 1997.

ALASKA PENINSULA REGION

INDUSTRIAL MINERALS

Closure of the military facilities at King Salmon required most of the sand and gravel used in this region, as well as 120,000 cubic yards of silt for capping material. A small amount of sand and gravel was also used to complete reconstruction of the South Naknek airport. Hopkins Brothers Construction Co. provided shot rock at Seldovia for local use.

SOUTHEASTERN REGION

METALS

Virtually all of the metal production in this region in 1997 was from the Greens Creek hardrock operation near Hawk Inlet on the west side of Admiralty Island west of Juneau (fig. 17).

The Greens Creek Mine (Kennecott 70.3 percent, Hecla Mining 29.7 percent) produced concentrates



Figure 17. Load-out conveyor for the Greens Creek Mine at Hawk Inlet west of Juneau. Photo by Mitch Henning.

containing payable 46,000 tons of zinc, 19,000 tons of lead, 56,000 ounces of gold, 9.7 million ounces of silver, and 1,300 tons of copper. Approximately 1,350 tons of ore are mined daily in two shifts using rubber-tired, diesel-powered, 3- and 6-yard scoops to load 20- and 40-ton trucks from a dozen active headings in the mine. The ore is trucked from the 920 level portal to the mill where, in a continuous-feed, electronically-monitored process, it is crushed, ground, separated, and floated. The concentrate is segregated into a lead and zinc concentrate, and the gold is separated before the concentrate is dewatered. Tailings are either mixed with cement and recycled to the mine as backfill, or are stored in the dry tailings facility. Water is recycled to the water treatment facility.

DRILLING

Table 16 is a listing of companies with significant drill programs in 1997. Table 17 summarizes 1997 drilling activity by region of the state. Table 18 shows the historical trends of drilling since 1982. The total amount of drilling, 757,488 feet, compares well with the 729,137 feet drilled in the previous year. Placer exploration (fig. 18) continues to decline, although there is a renewed

Production was reported at two placer gold mines in Porcupine Creek near Haines.

INDUSTRIAL MINERALS

The southeastern region was the major user of rock in the state in 1997 (3 million tons), with the majority being used for construction of the ferry terminal parking area near Juneau, and maintenance of logging roads throughout the Tongass National Forest. The City of Thorne Bay also reported using a small amount of shot-rock for road work near the city.

Hildre Sand & Gravel Co. produced sand and gravel from its Lemon Creek and Montana Creek Pits for local construction in the Juneau area.

interest in coal, particularly in the high-rank fields of southcentral Alaska at Wishbone Hill. Core drilling continues to dominate hardrock exploration, though there is a regional preference, with reverse-circulation drilling favored in western and interior Alaska, while core drilling is used exclusively in southeastern Alaska where most of the 1997 drilling was underground.

Table 16. Companies reporting significant drilling programs in Alaska in 1997

Abacus Minerals Corp.	Grayd Resources Corp.	Silverado Gold Mines Ltd.
Alaska Gold Co.	Intercontinental Mining Corp.	Sumitomo Metal Mining Canada Ltd./
Alaska Placer Development	International Freegold Mineral	Teck Corp.
American Copper & Nickel Co.	Development Inc.	Sumitomo Coal Mining Co. Ltd./Nerox
ASA Inc.	Liberty Bell Mining Inc.	Power Systems Inc.
Cominco Alaska Inc.	Kennecott Exploration Inc.	Teck Corp.
Consolidated Nevada	Kennecott Greens Creek Mining Co.	Tri-Valley Corp.
Goldfields Inc.	Newmont Exploration Ltd.	Usibelli Coal Mine Inc.
Cross Canada International Inc.	Placer Dome Exploration Inc.	Ventures Resource Alaska Corp.

Table 17. Drilling footage by region in Alaska, 1997

Type of drilling	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	TOTAL
Placer exploration	1,500	18,680	18,800	--	--	--	--	38,980
Placer thawfield	--	--	--	--	--	--	--	--
Placer subtotal	1,500	18,680	18,800	--	--	--	--	38,980
Coal subtotal	--	--	9,458	4,540	--	--	--	13,998
Hardrock core	59,036	68,353	143,743	--	83,544	--	169,000	523,676 ^a
Hardrock rotary	--	7,380	146,886	--	26,568	--	--	180,834
Hardrock subtotal	59,036	75,733	290,629	--	110,112	--	169,000	704,510
TOTAL (feet)	60,536	94,413	318,887	4,540	110,112	--	169,000	757,488

-- = Not reported.

^a130,000 feet of core drilling was underground.

Note: Blasthole drilling not reported. Approximately 600,000 feet in 1997.

Table 18. *Drilling footage reported in Alaska, 1982–97*

Year	Placer Exploration	Placer Thawing	TOTAL PLACER	TOTAL COAL	TOTAL HARDROCK	Hardrock Core ^a	Hardrock Rotary ^a	TOTAL FEET
1982	30,000	94,000	124,000	80,000	200,000	--	--	404,000
1983	23,000	30,000	53,000	12,000	180,500	--	--	245,500
1984	31,000	98,000	129,000	25,700	176,000	--	--	330,700
1985	46,000	34,000	80,000	8,700	131,700	--	--	220,400
1986	32,400	227,000	259,400	28,800	50,200	--	--	338,400
1987	50,250	130,000	180,250	19,900	115,100	95,600	19,500	315,250
1988	152,000	300,000	452,000	26,150	353,860	223,630	130,230	832,010
1989	97,250	210,000	307,250	38,670	332,230	242,440	89,790	678,150
1990	78,930	105,000	183,930	18,195	760,955	648,600	112,355	963,080
1991	51,247	130,000	181,247	16,894	316,655	205,805	110,850	514,796
1992	6,740	65,000	71,740	12,875	359,834	211,812	148,022	444,449
1993	25,216	--	25,216	--	252,315	124,325	127,990	277,531
1994	21,000	--	21,000	8,168	438,710	347,018	91,692	467,878
1995	27,570	--	27,570	--	415,485	363,690	51,795	443,055
1996	61,780	--	61,780	8,500	658,857	524,330	134,527	729,137
1997	38,980	--	38,980	13,998	704,510	523,676 ^b	180,834	757,488

^aCore and rotary drilling not differentiated prior to 1987.

^b130,000 feet of core drilling was underground.

-- = Not reported.

Note: Blasthole drilling not reported. Approximately 600,000 feet in 1997.



Figure 18. *Drilling at Alaska Gold Co.'s Submarine Pit. Photo by John Handeland.*

GOVERNMENT ACTIONS

During 1997 the Division of Geological & Geophysical Surveys (DGGS) released new geophysical surveys in the historic mining regions of Rampart, Chulitna, and Petersville—Collinsville. New surveys were contracted and flown during 1997 near Iron Creek in the Talkeetna Mountains north of Anchorage, and south of Ruby on the Yukon River. The Iron Creek survey results were released in January 1998 and the Ruby survey in February 1998. The Division also worked with the U.S. Bureau of Land Management (BLM) to contract for airborne surveys near Wiseman in the Brooks Range. In an unusual arrangement BLM and the City of Wrangell sponsored a survey of several islands near the city in southeastern Alaska. The Wrangell surveys were released late in 1997 and the Wiseman survey was released early in 1998.

Table 19 shows the revenues derived from the mining industry by the State of Alaska and by municipalities.

There was continued progress in clarification of

water quality standards for the state in 1997, and the U.S. Geological Survey, working with the Division of Mining & Water Management, started long-term baseline studies of water quality in the Forty-mile River drainage. The study includes differentiation of the total versus dissolved metals, metal speciation by valency, and lithogeochemical controls. It is hoped that these data will allow for more flexible permit conditions in the future.

Access to mineralized areas, especially across conservation systems units such as national parks or refuges, continues to be a State priority, and assertions of rights-of-way continue.

The appeal by some of the Mental Health Land Trust plaintiffs was denied by the State Supreme Court in 1997, leading to a final settlement of this contentious legal battle. The result is that the lands can now be offered for mineral leasing.

The Governor's 1997 award for mined land reclamation was given to Ed Salter of Manley for his

Table 19. Revenues paid to the State of Alaska and municipalities by Alaska's mineral industry, 1992–97^a

	1992	1993	1994	1995	1996	1997
State mineral rents and royalties						
State claim rentals	\$ 537,355	\$ 523,661	\$ 709,568	\$ 712,559	\$ 929,744	\$ 1,115,591
Production royalties	7,815	7,917	12,015	6,762	6,208	8,358
Mining license	465,153	425,607	481,907	484,035	481,000	1,900,000
Annual labor	--	--	--	--	62,900	89,500
Subtotal	1,010,323	957,185	1,203,490	1,203,356	1,479,852	3,113,449
State coal rents and royalties						
Royalties	1,294,825	1,486,100	1,399,912	1,866,952	1,348,841	1,250,000
Rents	198,835	198,835	198,835	172,024	206,515	205,500
Subtotal	1,493,660	1,684,935	1,598,747	2,038,976	1,555,356	1,455,500
State material sales						
Mental Health	104,845	5,300	54,772	106,505	126,000	299,000
Division of Land	491,235	561,414	174,484	351,094	431,815	403,169
SPCO	161,408	150,000	136,752	115,744	44,403	30,110
School fund	3,279	3,011	1,564	8,812	N/A	N/A
Subtotal	760,767	719,725	367,572	582,155	602,218	732,279
State total	3,264,750	3,361,845	3,169,809	3,824,487	3,637,426	5,301,228
Payments to Municipalities						
	N/A	N/A	N/A	N/A	N/A	8,386,000
TOTAL	\$3,264,750	\$3,361,845	\$3,169,809	\$3,824,487	\$3,637,426	\$13,687,228

^aDoes not include state corporate income taxes, which were not released for this study.

N/A = not available.

-- = not reported.

work on Doric Creek, a tributary of Pioneer Creek near Eureka in the Manley Hot Springs district. Awards were also presented to Marc Poage for work on Crooked Creek at Central, to Morris Wolters of Cathlamet, Washington, for his work on Crooked Creek, and to Ryan Lode Mines of Fairbanks. The prestigious "Health of the Land Award" was presented to Cambior USA Inc. by Patrick Shea, director of the U.S. Bureau of Land Management, for the exemplary reclamation of the Valdez Creek placer mine.



Figure 19. Tom Bundtzen receives an award from DNR Commissioner John Shively for 25 years of service in the Division of Geological & Geophysical Surveys shortly before his retirement in August 1997. Photo by Dick Swainbank.

Two long-term authors of these reports resigned in 1997. Thomas K. (Tom) Bundtzen received an award for 25 years of service to DGGS in July, and retired in August, to consult to the industry as Pacific Rim Geological Consulting (fig. 19). Albert H. (Al) Clough resigned from the Division of Trade & Development in August and joined Kvaerner Environmental in August 1997 to help in the closure of the Alaska-Juneau Mine (fig. 20).



Figure 20. Al Clough at the State of Alaska trade booth at the Prospectors & Development Association of Canada, March 1997. Photo by Dick Swainbank.

APPENDIX A

New claims staked in Alaska 1993-1997

Quad no.	Quadrangle name	New federal mining claims					New state mining claims				
		1993	1994	1995	1996	1997	1993	1994	1995	1996	1997
17	Point Hope	0	0	0	0	0	0	0	0	43	0
18	De Long Mountains	0	0	0	0	0	0	144	28	0	0
23	Philip Smith Mountains	0	0	0	0	0	0	0	0	0	0
26	Noatak	0	0	0	0	0	0	0	61	634	96
27	Baird Mountains	0	0	1	0	1	0	0	18	1	0
28	Ambler River	0	0	0	0	0	5	189	95	0	1,333
29	Survey Pass	0	0	0	0	0	0	0	0	0	722
30	Wiseman	278	39	20	0	47	5	55	34	6	44
31	Chandalar	9	9	12	3	17	16	21	502	118	75
32	Christian	0	0	0	0	0	0	0	0	0	0
35	Kotzebue	0	0	0	0	0	15	0	4	0	28
37	Shungnak	0	0	0	0	0	0	0	0	0	0
38	Hughes	0	0	0	0	0	0	0	0	0	72
39	Bettles	10	15	7	0	56	0	6	4	0	0
43	Teller	0	0	0	0	0	0	0	42	0	0
44	Bendeleben	0	0	0	0	0	13	4	31	55	67
45	Candle	0	0	0	0	0	4	11	21	16	201
47	Melozitna	0	0	0	0	0	24	6	4	4	0
48	Tanana	0	0	0	0	0	70	177	53	76	99
49	Livengood	33	0	0	0	1	153	146	545	1,838	352
50	Circle	0	0	0	0	0	477	256	413	100	658
51	Charley River	0	0	0	0	0	0	0	0	0	0
52	Nome	4	0	0	0	0	11	43	168	195	78
53	Solomon	0	0	0	0	0	8	56	39	31	29
54	Norton Bay	0	0	0	0	0	0	0	25	0	0
55	Nulato	0	0	0	0	0	5	0	0	0	0
56	Ruby	0	0	0	0	0	27	29	12	405	200
57	Kantishna River	0	0	0	0	1	0	0	14	0	0
58	Fairbanks	0	0	0	0	0	195	143	364	360	546
59	Big Delta	0	0	0	0	0	213	408	421	637	1,010
60	Eagle	0	0	0	0	0	170	171	116	122	171
64	Ophir	0	0	0	0	0	15	109	8	13	47
65	Medfra	0	0	0	0	0	2	30	0	0	128
66	Mt. McKinley	0	0	0	0	0	2	0	0	0	0
67	Healy	0	0	0	0	0	90	195	335	80	388
68	Mt. Hayes	0	12	171	124	772	80	163	858	622	1,185
69	Tanacross	0	0	0	0	0	14	18	69	236	112
72	Holy Cross	0	0	0	0	0	0	0	0	0	0
73	Iditarod	6	0	0	70	0	0	13	223	414	296
74	McGrath	0	0	0	0	0	0	0	0	0	0
75	Talkeetna	0	0	3	0	0	68	120	48	129	117
76	Talkeetna Mountains	0	0	0	0	4	61	45	48	234	50
77	Gulkana	0	0	0	0	0	2	0	0	0	192
78	Nabesna	0	0	0	0	0	0	0	0	0	2
81	Russian Mission	0	0	0	0	0	0	0	0	0	0
82	Sleetmute	0	0	0	0	0	0	8	22	0	0
83	Lime Hills	0	0	0	0	0	0	2	8	2	238
84	Tyonek	0	0	0	0	0	67	0	8	0	10
85	Anchorage	0	3	0	0	0	64	56	79	18	97
86	Valdez	0	0	0	0	0	0	2	20	11	8
87	McCarthy	0	0	0	0	0	0	0	0	0	0
91	Bethel	0	0	0	0	0	4	1	0	0	98
92	Taylor Mountains	0	0	0	0	0	0	0	5	0	142
93	Lake Clark	0	0	0	0	0	0	66	0	0	0

Quad no.	Quadrangle name	New federal mining claims					New state mining claims				
		1993	1994	1995	1996	1997	1993	1994	1995	1996	1997
94	Kenai	0	0	0	0	0	0	0	0	0	0
95	Seward	95	51	58	0	108	13	32	21	23	26
96	Cordova	0	0	0	0	1	0	0	0	0	0
97	Bering Glacier	0	0	0	0	0	0	1	0	2	3
102	Dillingham	0	0	0	0	0	0	219	4	7	32
103	Iliamna	0	0	0	0	0	0	0	1	1	325
104	Seldovia	0	0	0	0	0	0	2	0	0	0
107	Icy Bay	0	0	0	0	0	14	0	0	0	3
108	Yakutat	0	0	0	0	0	0	0	0	0	0
109	Skagway	1	1	2	0	4	99	318	36	8	5
111	Mt. Fairweather	0	0	0	0	0	0	0	0	0	0
112	Juneau	76	27	63	199	263	20	3	10	20	2
114	Sitka	8	39	2	0	7	0	0	2	0	0
115	Sumdum	0	0	0	0	0	0	0	0	0	0
116	Port Alexander	0	1	0	0	0	0	0	0	0	0
117	Petersburg	19	1	23	267	485	0	0	0	0	0
118	Bradfield Canal	0	0	0	0	0	0	0	0	0	0
119	Craig	62	89	14	18	101	8	1	0	48	0
120	Ketchikan	0	0	0	0	2	0	0	0	0	0
121	Dixon Entrance	0	9	0	0	1	0	2	0	0	0
123	Hagemeister Island	0	0	0	0	0	0	0	0	0	0
127	Afognak	0	45	0	0	0	0	0	32	0	0
133	Chignik	0	0	0	0	0	0	0	0	0	0
135	Trinity Islands	0	0	0	0	0	8	1	38	35	5
138	Port Moller	0	0	0	0	0	0	93	0	0	0
TOTALS		601	341	376	681	1,871	2,042	3,365	4,889	6,544	9,292

SOURCE: State of Alaska Division of Mining & Water Management Kardex file.

APPENDIX B

Prospecting sites in Alaska 1993-1997

APPENDIX B
Prospecting sites in Alaska 1993-1997
(continued)

Quad #	Quad name	1993						1994						1995						1996					
		New	Extend	Total	New	Extend	Total	New	Extend	Total	New	Extend	Total	New	Extend	Total	New	Extend	Total	New	Extend	Total	New	Extend	Total
84	Tyonek	18	0	18	6	18	24	0	0	0	0	0	0	0	0	0	0	0	0	6	14	20	0	0	22
85	Anchorage	13	0	13	14	2	16	16	9	25	18	7	25	22	0	0	0	0	0	0	0	0	0	0	0
86	Valdez	16	0	16	13	4	17	13	0	13	9	15	24	0	0	0	0	0	0	0	0	0	0	0	0
91	Bethel	1	0	1	0	0	0	0	0	0	0	0	0	12	6	18	4	8	12	6	6	12	6	6	12
92	Taylor Mts.	0	0	0	0	0	0	0	0	0	0	0	0	14	0	14	0	0	0	0	0	0	0	0	0
94	Kenai	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	Seward	4	0	4	0	0	0	0	1	0	1	0	1	73	40	113	2	24	26	2	24	26	2	24	26
97	Bering Glacier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	Dillingham	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	Iliamna	0	0	0	4	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	Seldovia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
109	Skagway	36	0	36	8	16	24	0	0	0	0	0	0	13	0	13	6	0	6	0	0	0	0	0	6
112	Juneau	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
119	Craig	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	Ketchikan	4	0	4	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0
135	Trinity Islands	3	0	3	25	0	25	1	2	3	14	0	14	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS		1,222	233	1,455	710	698	1,408	943	447	1,390	2,157	852	3,009	2,699	993	3,692									

SOURCE: State of Alaska Division of Mining & Water Management Kardex file.

APPENDIX C

Mining licenses issued by and received from the Alaska Department of Revenue, 1997

Entries include in this order: company name (region), address, resource, site of operation, mining district, and license number. Alaska Peninsula Region (APR), Eastern Interior Region (EIR), Northern Region (NR), Southcentral Region (SCR), Southwestern Region (SWR), Southeastern Region (SER), Undistributed (UR), Western Region (WR), and not given (NG).

A & L Mining (WR) PO Box 1974 Nome, AK 99762 Gold—Silver Coffee Creek Cape Nome district ML 9067	Fairbanks, AK 99701 Gold—Silver Livengood Creek Livengood—Tolovana district ML 7226	Gold Bear Creek Fairhaven district ML 5167	Fortymile district ML 9088
Ackels, Del (NR) PO 61520 Fairbanks, AK 99706-1520 Gold—Silver Big Creek Chandalar district ML 9036	Aldridge, William (NG) PO Box 1334 Palmer, AK 99645 Gold—Silver Poker Creek Unknown district ML 4399	Arctic Mining (EIR) PO Box 30144 Central, AK 99730 Gold—Silver Crooked Creek Circle district ML 5888	Beistline, Earl H. (EIR) PO Box 80148 Fairbanks, AK 99708-0148 Gold—Silver Eagle and Cripple creeks Circle district ML 7106
Administrative Services (EIR) PO Box 70495 Fairbanks, AK 99707-0495 Mineral Ketchum Creek Circle district ML 9151	AM Mining Ltd. (EIR) PO Box 10263 Fairbanks, AK 99710-0263 Gold—Silver Dome Creek APMA #9135 Fairbanks district ML 99112	Arctic Whitney Inc. (WR) PO Box 782 Nome, AK 99762 Gold—Silver Norton Sound Cape Nome district ML 9451	Bergman, Kevin (EIR) PO Box 71488 Fairbanks, AK 99707 Gold—Silver Ester Creek Fairbanks district ML 9402
AG Mining (SWR) PO Box 106 McGrath, AK 99627-0106 Gold—Silver Dodge Creek Innoko district ML 5706	American Copper & Nickel Co. (EIR) One New York Plaza New York, NY 10004 Base Metals Alaska Range ML 9119	AU Mining Co. (WR) PO Box 292 Willow, AK 99688 Gold—Silver Candle Creek Candle district ML 5853	Bering Straits Native Corp. (WR) PO Box 1008 Nome, AK 99762 Gold—Silver Nome River Cape Nome district ML 99125
Alaska Boulder Creek Ltd. (EIR) 9208 Holly Drive Everett, WA 98204 Gold Boulder Creek Hot Springs district ML 99118	Anchorage Sand & Gravel Co. Inc. (SCR) 1040 O'Malley Rd. Anchorage, AK 99515 Gravel Anchorage district ML 99028	AU Mining Co. (WR) PO Box 292 Willow, AK 99688 Gold—Silver Mud Creek Candle district ML 7388	Bering Straits Native Corp. (WR) PO Box 1008 Nome, AK 99762 Gold—Silver Hastings Creek Cape Nome district ML 99005
Alaska Gold Company (WR) PO Box 640 Nome, AK 99762 Gold—Silver Third Beach/Dry Creek Cape Nome district ML 5821	Anderson & Son Mining (SWR) Allan Anderson PO Box 277 McGrath, AK 99627-0277 Gold—Silver Yankee Creek Innoko district ML 6205	Barron, Dennis (WR) PO Box 923 Nome, AK 99762 Gold—Silver Goose and Quartz creeks Fairhaven district ML 9475	Bering Straits Native Corp. (WR) PO Box 1008 Nome, AK 99762 Gravel Beam Road Cape Nome district ML 99123
Alaska Gold Company (WR) PO Box 640 Nome, AK 99762 Gold—Silver Cape Nome district ML 9393	Angell, William R. (EIR) 417 Glacier Ave. Fairbanks, AK 99701 Gold—Silver Fortymile River Fortymile district ML 9381	Bauer, Tod PO Box 871502 Wasilla, AK 99687 Gold—Silver Eldorado Creek Unknown district ML 6191	Bering Straits Native Corp. (WR) PO Box 1008 Nome, AK 99762 Gravel Unalakleet Anvik district ML 99122
Alaska/Nevada Gold Mines Ltd. (EIR) 626 2nd St., Suite 202	Applebee, Robert (WR) 4111 E. 65th Ave. Anchorage, AK 99507	Bayless, Bill (EIR) Drawer F Copper Center, AK 99573 Gold—Silver Franklin Street	Berry Enterprises (EIR) 1101 Barnette St. Fairbanks, AK 99701

Gold—Silver Ketchum Creek Circle district ML 99084	Byrd, Paul (EIR) 11192 Highway 37 Hibbing, MN 55746 Gold—Silver Fortymile River Fortymile district ML 9452	PO Box 778 Kotzebue, AK 99752 Gold Old Glory Creek Noatak district ML 9420	Poorman Creek Yentna—Cache Creek district ML 5689
Bickell, D. Harvey (EIR) PO Box 1026 Dawson City, YT Y0B 1G0 Gold—Silver Near Walker Fork Fortymile district ML 9356	Carlo & Sons Mining Co. (EIR) 2113 Southern Ave. Fairbanks, AK 99709 Gold—Silver Hunter Creek Rampart district ML 7122	CIRI (SCR) PO Box 93330 Anchorage, AK 99509 Chromium Eklutna area Anchorage—Hatcher Pass district ML 99021	Cook, Fred A. (EIR) PO Box 311 Delta Junction, AK 99737-0311 Gold—Silver Portage Creek Bonnifield district ML 9248
Blue Ribbon Inc. (SCR) PO Box 871906 Wasilla, AK 99688 Gold Tributary of Cottonwood Creek Yentna—Cache Creek district ML 99082	Carr, Brad (EIR) PO Box 25 Chicken, AK 99732-0025 Gold—Silver Fortymile River Fortymile district ML 99119	CIRI (SCR) PO Box 93330 Anchorage, AK 99509 Unknown commodity Tyonek area Anchorage district ML 99023	Cook's Mining (EIR) PO Box 70456 Fairbanks, AK 99707-0456 Gold—Silver Fairbanks Creek Fairbanks district ML 5955, 6973
Boehne, Roland L. 205 E. Dimond Blvd. #451 Anchorage, AK 99515 Gold—Silver Red Creek Unknown district ML 5657	Cassiterite Placers Inc. (EIR) 413 Cowles St. Fairbanks, AK 99701 Gold—Silver Cache, Sullivan, Quartz, and Tofty creeks Hot Springs district ML 7399	CIRI (SCR) PO Box 93330 Anchorage, AK 99509 Chromium Seldovia area Homer district ML 99024, 99025	Cope, Roger C. (NG) PO Box 75404 Fairbanks, AK 99707-5404 Gold—Silver Lewis Creek Unknown district ML 9411
Botnan, Ted R. (EIR) 9950 Stephen Richards Dr. Juneau, AK 99801 Gold Treasure Creek Fairbanks district ML 5951	Caswell, James W. (SCR) PO Box 196 Cantwell, AK 99729 Limestone Valdez Creek district ML 7437	Clara Bea Inc. (WR) PO Box 2561 Seward, AK 99723 Gold—Silver Candle Creek Fairhaven district ML 7489	Cyprus Gold Exploration Corp. (EIR) PO Box 3299 Englewood, CO 80112 Gold Not given Unknown district ML 99107
Bracale, Carl. A. Jr. (NG) PO Box 858 Gig Harbor, WA 98335 Gold—Silver Camp Creek Unknown district ML 7302	Catt, Bruce D. & Barbara (EIR) PO Box 45 Central, AK 99730 Gold—Silver Crooked Creek Circle district ML 9310	Clark—Wiltz Co. Inc. (SWR) PO Box 327 McGrath, AK 99627 Gold—Silver Ganes Creek Innoko district ML 5696	DaGagne, Joseph III (SCR) PO Box 877226 Wasilla, AK 99687 Gold—Silver Cache Creek Yentna district ML 5741
Bradley, Joe 529 Lynwood Anchorage, AK 99518 Gold—Silver Skookum Unknown district ML 99116	Chase, Ernest M. (SWR) PO Box 141 Aniak, AK 99588 Gold—Silver Flat Creek Marshall—Anvik district ML 5611	Cominco Alaska Exploration (NG) PO Box 3087 Spokane, WA 99220 Base metals Tributary to Talarik Unknown district ML 6118	Daglow Exploration (NR) PO Box 80930 Fairbanks, AK 99708 Gold—Silver Big Creek Chandalar district ML 9364
Bras, Cy (EIR) 703 Swires Rd. Kenai, AK 99611 Gold—Silver Canyon Creek Fortymile district ML 9004	Christensen, Robert & Kathleen (NG) PO Box 871075 Wasilla, AK 99687-1075 Gold, Heavy metals Unknown district ML 5722	Cominco American Inc. (WR) 15124 E. Euclid Ave. Spokane, WA 99216 Base metals Divide and Quartz creeks Cape Nome district ML 5499	Delaney, Arley HC 31 Box 5066 Wasilla, AK 99654 Gold—Silver Purches Creek Unknown district ML 5737
Burns, John R. (EIR) PO Box 5 Chicken, AK 99732-0005 Gold—Silver Davis Creek Fortymile district ML 4419	Chukchi Contracting Inc./Chukchi Miners (NR)	Conway, James P. (SCR) HC 2 Box 7660 Palmer, AK 99645-7660 Gold—Silver	Delima, Don P. (EIR) PO Box 56106 Manley Hot Springs, AK 99756 Gold—Silver Boulder Creek Hot Springs district ML 7194

DeVore, Wesley (EIR) 665 3rd Ave. Redwood City, CA 94063 Gold—Silver Mosquito Fork, Fortymile River Fortymile district ML 9448, 99121	Fairbanks, AK 99701 Gold—Silver St. Patrick, Happy, and Eva creeks Fairbanks district ML 5913	Doric Creek Hot Springs district ML 9317	Gibson, Wayne (WR) 1610 Southern Fairbanks, AK 99709 Gold—Silver Golden Creek Gold Hill—Melozitna district ML 9032
DeWitt, Estill (SCR) 2260 Belmont Dr. Anchorage, AK 99517 Gold—Silver Caribou and Alfred creeks Nelchina district ML 99075	Engstrom Dredging Co. (WR) PO Box 536 Nome, AK 99762 Gold—Silver Basin Creek Cape Nome district ML 7116	Flat Creek Mining Co. Inc. (SWR) PO Box 81464 Fairbanks, AK 99708 Gold—Silver Flat Creek Marshall district ML 5824	Girdwood Mining Co. SCR) PO Box 1089 Anchorage, AK 99587-1089 Gold—Silver Crow Creek Anchorage district ML 5590
Dooley, Christopher (NG) 15411 Husky St. Eagle River, AK 99577 Not given Not given Not given ML 9470	Faa, Thomas (EIR) PO Box 10906 Fairbanks, AK 99710 Gold—Silver Eva Creek Bonnifield district ML 6801	Flat Creek Placers (SWR) General Delivery Flat, AK 99584 Gold—Silver Flat Creek Iditarod district ML 5503	Glacier Six Enterprises (EIR) Vic Justis Route 2 Box 735 Soldotna, AK 99669 Gold—Platinum Broxson Creek Delta River district ML 7311
Double J Mining (EIR) Judd Edgerton PO Box 34 Chicken, AK 99732 Gold—Silver Napoleon Creek Fortymile district ML 7485	Fair, Dan W. (NG) 3457 Old Richardson Hwy. North Pole, AK 99705 Unknown commodity Unknown district ML 9144	Flat Pick Mining (EIR) PO Box 115 Central, AK 99730-0115 Gold—Silver Switch Creek Circle district ML 6892	Glassburn, Don E. (EIR) PO Box 107 Central, AK 99730 Gold—Silver Gold Dust Creek Circle district ML 7010
Ellet Management Co., Inc. (EIR) 3535 Lansing Rd. Charlotte, MI 48813 Gold—Silver Olive Creek Tolovana district ML 9433	Fairbanks Gold Mining Inc. (EIR) PO Box 73726 Fairbanks, AK 99707 Gold Melba Creek Fairbanks district ML 9156	Fogarty, James & Sharon (EIR) 3498 Lurance Rd. North Pole, AK 99705 Gold—Silver Flume Creek Fairbanks district ML 9373	Global Resources Inc. (EIR) 43445 Business Park Dr. Temecula, CA 92590 Gold—Silver Cripple Creek Fairbanks district ML 9132
Ellingson, Harold & Alice (EIR) 1890 Steese Hwy. Fairbanks, AK 99712 Gold—Silver First Chance Creek Fairbanks district ML 9495	Faulkner, Harry Sr. (SWR) PO Box 1307 Bethel, AK 99559-1307 Gold—Silver Ophir Creek Aniak—Tuluksak district ML 6157	Franko, Chris (EIR) Escondido, CA 92029 Gold—Silver Sourdough Creek Fairbanks district ML 9442	Gold Hill Mining Co. (EIR) 30033 Redwood Hwy. Cave Junction, OR 97523 Gold—Silver Harrison Creek Circle district ML 7289
Ellis, Ed (SCR) PO Box 13443 Trapper Creek, AK 99683 Gold—Platinum Lake Creek Yentna district ML 5607	Ferren, Danny W. (SCR) PO Box 2248 Homer, AK 99603 Gold—Silver Six Mile and Cub creeks Hope district ML 2705	G.A. Hanks & Sons (EIR) 18909 Old River Rd. W. Sacramento, CA 95691 Gold—Silver Lost Chicken Creek Fortymile district ML 5828	Gold Star Mining (EIR) Ross Novak PO Box 83200 Fairbanks, AK 99708-3200 Gold—Silver Eureka Creek Hot Springs district ML 7060
Ellis, Ed (SCR) PO Box 13443 Trapper Creek, AK 99683 Gold—Platinum Kahiltna River Yentna district ML 5735	Fichtelman, Guy/Don Collier (EIR) PO Box 70 Chicken, AK 99732-0070 Gold—Silver Fortymile River Fortymile district ML 9177	Gelvin, Stanley M. (EIR) PO Box 30149 Central, AK 99730 Gold—Silver Greenhorn Creek Circle district ML 9437	Golden Glacier Inc. (WR) PO Box 1008 Nome, AK 99762 Gold—Silver Cooper Gulch Cape Nome district ML 99127
Emerson, Robert C. (EIR) 1811 Phillips Field Rd.	Fisher, Paul S. (EIR) PO Box 71041 Fairbanks, AK 99707-1041 Gold—Silver	Geo Quest (EIR) Michael Busby PO Box 71 Chicken, AK 99732 Gold—Silver Chicken Creek Fortymile district ML 6794	

Goodson, Richard (EIR) 2605 E. 50th, #8 Anchorage, AK 99507 Gold—Silver North Fork Fortymile River Fortymile district ML 9052	Groppel, Chris L. (EIR) PO Box 1060 Delta Junction, AK 99737-1060 Gold—Silver Tenderfoot Creek Richardson district ML 5944	Fairbanks, AK 99708 Gold—Silver Walker Fork Fortymile district ML 9124	Unknown district ML 5823
Granath, Gene A. (SCR) PO Box 574 Kenai, AK 99611-0574 Gold—Silver Falls Creek Hope—Sunrise district ML 5633	Gumaer, Mark & Robin (WR) PO Box 1682 Nome, AK 99762-1682 Gold—Silver Dick Creek Kougarok district ML 7223	Herman, Daniel C. (NG) Red Devil, AK 99656 Gold—Silver Millie Creek Unknown district ML 99099	Hron, Thomas (SCR) 4125 Aircraft Dr. Anchorage, AK 99502 Gold—Silver Lake Creek Yentna district ML 5740
Granite Creek Mining (SWR) PO Box 261 McGrath, AK 99627-0261 Gold—Silver Granite Creek McKinley—Iditarod district ML 6223	Hall, John B. (NR) PO Box 72700 Fairbanks, AK 99707-2700 Gold—Silver Linda Creek Koyukuk district ML 7203	Herndon & Thompson Leasing Co. (SCR) 41745 Bear Creek Rd. Homer, AK 99603 Gravel Homer district ML 99018, 99019	Jackson Mining Co. (EIR) 936 Coppet St. Fairbanks, AK 99709 Gold—Silver Totatlanika River Bonnifield district ML 7469
Green Mining & Exploration (EIR) PO Box 61455 Fairbanks, AK 99706-1455 Gold—Silver Hunter Creek Rampart district ML 9396	Hannah, John (EIR) PO Box 61117 Fairbanks, AK 99706-1117 Gold—Silver Flume, Moose, and Pedro creeks Fairbanks district ML 9035	Herning, Bruce G. (EIR) PO Box 73846 Fairbanks, AK 99707-3846 Gold—Silver Palmer Creek Fairbanks district ML 4482	Jacobs, David (EIR) HC1 Box 3090 Healy, AK 99743 Gold—Silver Rex Creek Bonnifield district ML 9329
Green Mining & Exploration (EIR) PO Box 61455 Fairbanks, AK 99706-1455 Gold—Silver Birch Creek Circle district ML 9136	Hansen, Kenneth C. (EIR) PO Box 10657 Fairbanks, AK 99710 Gold—Silver Faith Creek Fairbanks district ML 7047	Herzog, Martin M. (SCR) 438 Sundew Lane Fairbanks, AK 99712 Gold—Silver Cache Creek Yentna district ML 6073	Jensen, Daniel D. (EIR) PO Box 12 Delta Junction, AK 99737-0012 Gold—Silver McComber Creek Delta River district ML 7593
Green Mining & Exploration (WR) PO Box 61455 Fairbanks, AK 99706-1455 Gold—Silver Long Creek Ruby district ML 7094	Hassel, Gerald (EIR) PO Box 49 Ester, AK 99725-0049 Gold—Silver Ready Bullion Creek Fairbanks district ML 7201	High Bench Mining (WR) Daniel Walsh 4600 Mars Dr. Anchorage, AK 99507 Gold—Silver Dexter and Anvil creeks Cape Nome district ML 5994	Jiles, Overton J. (NG) 5250 Auburn Folsom Rd. Loomis, CA 95650 Gold Gold Bottom Gulch Unknown district ML 7249
Greene, Steve (EIR) 1648 Tamarack Fairbanks, AK 99709 Gold—Silver Davis Creek Fortymile district ML 9089	Hayden, Forest A. (EIR) PO Box 110930 Anchorage, AK 99511 Gold—Silver Baby and Squaw creeks Fortymile district ML 99093	Hooper, Gerald W. PO Box 71 Soldtona, AK 99669 Gold—Silver Swift Creek Unknown district ML 9048	Johnson, Ernest (NG) 222 Kern St. Taft, CA 93268 Not given Not given Unknown district ML 9478
Grizzly Bar Development LLC (SER) PO Box 20270 Juneau, AK 99802-0270 Gold—Silver Taku River Juneau district ML 5739	Hefflinger Mining Co. (EIR) 665 10th Ave., #307 Fairbanks, AK 99701 Gold—Silver Livengood Creek Livengood—Tolovana district ML 7235	Hopen, Alf M. (EIR) PO Box 74246 Fairbanks, AK 99707 Gold—Silver Cleary Creek Fairbanks district ML 99039	Johnson, Gregory (SCR) 12141 Curtic Circle Eagle River, AK 99577 Gold—Silver Bird Creek Anchorage district ML 5742
	Hefflinger, Fred (EIR) PO Box 82390	House, Conrad H. (NG) 3911 Tilleson Way North Pole, AK 99705 Gold—Silver Swift Creek	Keller, Robert W. (EIR) PO Box 385 Huntington, OR 97909-0385 Gold—Silver Totatlanika River Bonnifield district ML 5889

Kelly, Tim (EIR) PO Box 112 Manley, AK 99756 Gold—Silver North Fork Creek Hot Springs district ML 7057	Chicken, AK 99732 Gold—Silver Mosquito River Fortymile district ML 7220	Union Gulch Koyukuk—Nolan district ML 9165	Unknown district ML 99113
Kiehl, Don T. (EIR) 3210 Marneet Lane North Pole, AK 99705 Gold—Silver Gold King Creek Bonnifield district ML 5871	LaCross, Jack (SCR) PO Box 387 Trapper Creek, AK 99683 Gold—Silver Fergy Creek Yentna—Cache Creek district ML 2704	Lucky Seven Mining (EIR) Ron Roman PO Box 71614 Fairbanks, AK 99707 Gold—Silver Last Chance Creek Fairbanks district ML 9105	McPherson, Roger (EIR) 1042 Gilmore St. Fairbanks, AK 99701 Gold—Antimony Hattie Creek Fairbanks district ML 7015
Kile, Alvin & Eric (EIR) PO Box 140424 Anchorage, AK 99514-0424 Gold—Silver Canyon and Camp creeks Fortymile district ML 5838	Lankford, Steve E. (SCR) HC 89 Box 540 Willow, AK 99688-0549 Gold—Silver Albert Creek Nelchina district ML 7362	Lyle Avenue LLC (NG) PO Box 56186 North Pole, AK 99705 Not given Not given Unknown district ML 99117	McWilliams, Howard (SCR) PO Box 221603 Anchorage, AK 99522 Gold—Silver Chuina Yentna district ML 99053
Klopman, Jamin/Joe Daugherty HC04 9749 Palmer, AK 99645 Gold—Silver Taylor West Fortymile district ML 5681	Las, Alan E. (EIR) PO Box 55069 North Pole, AK 99705-5069 Gold—Silver No Grub Creek Fairbanks district ML 7362	Mason, Arnold J. (EIR) PO Box 140467 Anchorage, AK 99514 Gold North Creek Cache district ML 5516	Metco Inc. (SCR) HCR 64 Box 300 Seward, AK 99664 Gravel Homer district ML 99016
Knutson, Theodore (EIR) PO Box 1298 Chouteau, OK 74337-1298 Gold—Silver Mammoth Creek Circle district ML 7323	Lines, Lester E. (EIR) PO Box 103820 Anchorage, AK 99510-3820 Gold—Silver North Fork Harrison Creek Circle district ML 7332	Matter, Mark (SWR) PO Box 44 Aniak, AK 99557-0044 Gold—Silver Marvel Creek Aniak—Tuluksak district ML 5617	Miller, Lawrence (NG) PO Box 182 Healy, AK 99743 Unknown commodity Unknown district ML 9372
Kralik, Jan (WR?) PO Box 1793 Nome, AK 99762-1793 Gold—Silver Gold Run Unknown district ML 5864	Little Eldorado Group (EIR) W.L. Shaffer PO Box 80148 Fairbanks, AK 99708 Gold—Silver Near Little Eldorado Creek Fairbanks district ML 9094	Maxwell, Leslie or Barbara (EIR) 3910 Loc Sault Ave. Anchorage, AK 99516 Gold—Silver Canyon Creek Fortymile district ML 6344	Minex International Inc. (NG) PO Box 103 Girdwood, AK 99587-0103 Unknown commodity Unknown district ML 5006
Krug, Randy (EIR) 28514 134th St. E Buckley, WA 98321 Gold—Silver Sourdough Fairbanks district ML 9447	Losonsky, Steve (EIR) PO Box 80321 Fairbanks, AK 99708-0321 Gold—Silver Hunter Creek Rampart district ML 7328	May, Don (EIR) 4545 Woodriver Drive Fairbanks, AK 99709 Gold—Silver Ridge Top Fairbanks district ML 9427	Misovich, Andrew W. (EIR) PO Box 71489 Fairbanks, AK 99707-1489 Gold—Silver Chatham Creek Fairbanks district ML 3014
Krzykowski, Ben (EIR) PO Box 60091 Fairbanks, AK 99706-0091 Gold—Silver Big Eldorado Creek Fairbanks district ML 5981	Loud, Richard L. (EIR?) PO Box 10570 Fairbanks, AK 99710-0570 Gold—Silver Harrison Creek Circle district ML 6006	Maydole, Peter (EIR) PO Box 302 Healy, AK 99743 Gold—Silver California Creek Bonnifield district ML 9450	Mitchell, Harold (EIR) PO Box 65 Chicken, AK 99732-0065 Gold—Silver Mosquito Fork Fortymile district ML 7282
Kukowski, Dave (EIR) PO Box 6	Lounsbury Mining Inc. NR PO Box 70983 Fairbanks, AK 99707-0983 Gold—Antimony	MC Mining (NG) PO Box 870750 Wasilla, AK 99687 Gold—Silver White Creek	Montgomery, Melvin or Lois (EIR) 6028 Mackay Anchorage, AK 99518 Gold—Silver Gilliland Creek Fortymile district ML 9168

Monzulla, Vincent C. (EIR) 2920 Monzulla Ln. Fairbanks, AK 99712 Gold-Tungsten Victoria Creek Fairbanks district ML 625	Fairbanks, AK 99708-1155 Gold-Silver Little Minoonk Jr. Rampart district ML 5862	Anchorage, AK 99501 Gold-Silver Bear Creek Aniak-Tuluksak district ML 5641	PO Box 72748 Fairbanks, AK 99707 Gold-Silver Omega Creek Fortymile district ML 9062
Moore, Roger (EIR) 288 Rambling Rd. Fairbanks, AK 99712 Gold-Silver Ester Creek Fairbanks district ML 9331	NB Tweet & Sons (WR) PO Box 1107 Nome, AK 99762-1107 Gold-Silver Kougarok River Kougarok district ML 5845	O'Donnell, Franklin L. Jr. (EIR) 7110 Canaday Rd. Salcha, AK 99714 Gold-Silver Moose Creek Bonnifield district ML 8978	Owen, Jeff (EIR) Box BYA Tok, AK 99780 Gold-Silver Younger Creek Fortymile district ML 5807
Morgan, Tom (EIR) 842 Poirier St. Coq, BC V3J 6C2 Canada Gold McCord Creek Fairbanks district ML 5893	Ness, Ken (NG) 1137 Tower Rd. Castle Rock, WA 98611 Not given Not given Unknown district ML 99109	Old Yeller Mine (SCR) Ralph Simonson 72382 Palmer Jct. Rd. Elgin, OR 97827 Gold-Silver Surprise Creek Valdez Creek district ML 6736	Owen, Ted (EIR) 12307 E. Stillwater Redding, CA 96003 Gold-Silver Walker Fork Fortymile district ML 9039
Morris, Claude (NG) PO Box 547 Girdwood, AK 99587 Not given Not given Unknown district ML 6089	Nevers, Harold A. (EIR) 8148 Pinewood Dr. Juneau, AK 99801 Gold-Silver American Creek Hot Springs district ML 7284	Olson, Alan G. (WR) PO Box 165 Palmer, AK 99645-0165 Gold-Silver Candle Creek Candle district ML 6219	Pacific Alaska Resources (EIR) PO Box 4879 Vancouver, WA 98662 Gold-Base metals Stonehouse Creek area Bonnifield district ML 9463
Morris Mining (NG) General Delivery Willow, AK 99688 Gold-Silver Grubstake Gulch Unknown district ML 99120	Newmont Exploration Ltd. (EIR) 1818 Steese Hwy. Fairbanks, AK 99712 Gold-Silver Dome and Little Eldorado creeks Fairbanks district ML 7522	Olson, Dave (WR) PO Box 1835 Nome, AK 99762 Gold-Silver Canyon Creek Cape Nome district 9434	Pacific Mining (NG) PO Box 110842 Anchorage, AK 99511 Gold-Silver Porcupine Creek Unknown district ML 9129
Mrak, William (SCR) PO Box 1963 Palmer, AK 99645-1963 Gold Willow and Grubstake creeks Hatcher Pass district ML 6220	Nicholson, Doug & Peter Frantz (NR) 3865 Ullrbahn Fairbanks, AK 99709 Gold-Silver Linda Creek Koyukuk district ML 9080	Olson, Gordon E. (EIR) 7100 N. Milford Rd. Holly, MI 48442 Gold-Silver Jack Wade Creek Fortymile district ML 5923	Paradise Valley Inc. (NR) Bettles, AK 99726 Gold-Silver Birch, Oregon, and Angess creeks Koyukuk-Nolan district ML 6921
Mullikin, Christopher L. (WR) PO Box 790 Homer, AK 99603-0790 Gold-Silver Boulder and Turner creeks Kougarok district ML 9061	Nordeen, William H. (NR) PO Box 9013 Fairbanks, AK 99701-9013 Gold-Silver Emma Creek Koyukuk-Nolan district ML 7372	Olson, Stephen G. (EIR) PO Box 106 Tok, AK 99780-0106 Gold-Silver Liberty Creek Fortymile district ML 5883	Parr, Glen C. (EIR) 624 Maple Shelton, WA 98584 Gold-Silver Little Moose Creek Bonnifield district ML 6936
Mullikin, Dan (WR) PO Box 790 Homer, AK 99603-0790 Gold-Silver Noxapaga and Boulder creeks Kougarok district ML 7271	Nova Natural Resources Corp. (WR) PO Box 481388 Denver, CO 80248-1388 Gold-Silver Cape Nome district ML 9092	Olson, Steven L. (EIR) PO Box 10655 Fairbanks, AK 99710-0655 Gold-Silver Eagle Creek Fortymile district ML 6925	Paul & Co. (EIR) PO Box 83102 Fairbanks, AK 99708 Gold-Silver Frying Pan Creek Circle district ML 9407
Munsell, James L. (EIR) PO Box 81155	Nyac Mining Co. (SWR) Tuluksak Dredging Ltd. 415 8th Ave.	Omega Mining Co. (EIR) Richard Ott	Penz, Dave (SWR) PO Box 29 Russian Mission, AK 99657 Gold Buster Creek

Marshall district ML 6216	Pomrenke, Steve (WR) PO Box 308 Nome, AK 99762 Gold—Silver Tripple Creek Cape Nome district ML 9055	Gold—Silver Chicken Creek Fortymile district ML 7303	Lucky Gulch Valdez Creek district ML 2701, 9096
Perkins Mining Tech (SCR) PO Box 671475 Chugiak, AK 99567 Gold—Silver Willow Creek Willow Creek district ML 5746, 5749	Pushcar, Jerry (WR) PO Box 1604 Nome, AK 99762 Gold—Silver Iron and Benson creeks Unknown district ML 9462	Roberts, Roger L. (SWR) PO Box 7 Ophir—Takotna, AK 99675-0007 Gold—Silver Ophir and Gold Run creeks Innoko district ML 8078	Sather, Norman M. (EIR) 1213 Copper St. Fairbanks, AK 99709 Gold—Silver Fairbanks Creek Fairbanks district ML 7112
Peterson, Donald E. (SER) PO Box 172 Haines, AK 99827 Gold—Silver Porcupine Creek Juneau district ML 5700	Quartz Creek Exploration (SCR) Milo Floth PO Box 242 Sterling, AK 99672 Gold—Silver Quartz Creek Hope district ML 6208	Roop, John Sr. (EIR) 9499 Brayton Dr., #22 Anchorage, AK 99507 Gold—Silver Fortymile River Fortymile district ML 5974	Sayer, Paul (SWR) PO Box 10 Homer, AK 99603-0010 Gold—Silver Little Creek Innoko district ML 6233
Pharis, Michael & Jim Olmstead (NR) 3410 Tilleson Way North Pole, AK 99705 Gold—Silver Gold Creek Koyukuk—Nolan district ML 9403	Read, Donald M. (EIR) PO Box 71638 Fairbanks, AK 99707-1638 Gold—Silver Vault Creek Bench Fairbanks district ML 7293	Rosander Mining Co. (WR) PO Box 129 McGrath, AK 99627-0129 Gold—Silver Colorado Creek Innoko district ML 6806	Schafer, Beatrice/Terry Russell (NG) PO Box 55074 North Pole, AK 99705-5074 Unknown commodity Unknown district ML 9390
Philpott, Roy (EIR) PO Box 72198 Fairbanks, AK 99707-2198 Gold—Silver Smith Creek Koyukuk—Nolan district ML 5830	Redmond, Richard J. (NG) PO Box 8700 Indian, AK 99540-8700 Unknown commodity Unknown district ML 6366	Rowallan Inc. (SCR) PO Box 318 Clam Gulch, AK 99568-0318 Gold—Silver White and Valdez creeks Valdez Creek district ML 5552	Schene, Earl L. (EIR) PO Box 66 Chicken, AK 99732-0066 Gold—Silver Uhler Creek Fortymile district ML 6937
Placer Dome US Inc. (NG) 200 W Int'l Airport Rd. C-1 Anchorage, AK 99502 Not given Not given Unknown district ML 9456	Reed, Scott C. (EIR) PO Box 453 Crown King, AZ 86343 Gold—Silver North Fork Fortymile River Fortymile district ML 9387	RSH Company (SER) Ralph Horecny PO Box 211474 Auke Bay, AK 99821-1474 Sand and Gravel Lemon Creek Juneau district ML 99014	Schnabel, John J. (SER) PO Box 149 Haines, AK 99827 Gold—Silver Porcupine Creek Porcupine district ML 7401
Placer Dome US Inc. (NG) 240 S. Rock #117 Reno, NV 89502 Not given Not given Unknown district ML 9432, 9439	Regner, Leo A. (EIR) PO Box 72733 Fairbanks, AK 99707-2733 Gold—Silver Lilliwig and Ingle creeks Fortymile district ML 6037	RSH Company (SER) Ralph Horecny PO Box 211474 Auke Bay, AK 99821-1474 Sand and Gravel Lemon Creek Juneau district ML 99015	Schwartz, John (EIR) PO Box 19 Chicken, AK 99732 Gold—Silver Our Creek Fortymile district ML 9322
Plano, Dan and Cindy (SWR) PO Box 878275 Wasilla, AK 99687-8275 Gold—Silver Anvil Creek/Innoko River Innoko district ML 5570	Renk, Russell (WR) 641 W. 91st Ave. Anchorage, AK 99515 Gold—Silver Willow Creek Solomon district ML 5718	Rubel, John D. (EIR) 8183 Richardson Hwy. Salcha, AK 99714 Gold—Silver Banner Creek Richardson district ML 7334	Scofield, Walter P. (EIR) PO Box 945 Tok, AK 99780-0945 Gold—Silver South Fork Fortymile River Fortymile district ML 7451
Point Lena Investments LLC (SER) PO Box 32159 Juneau, AK 99803 Not given Formerly Red Samm Creek Juneau district ML 99111	Roberts, Robert W. (EIR) PO Box 225 Tok, AK 99780	Ryan Lode Mines (SCR) 2173 University Ave. S., #101 Fairbanks, AK 99709 Gold	SDC Mining (NG) 1095 Violet Dr. Fairbanks, AK 99712 Not given Not given Unknown district ML 9446

Seboms, Mark (SER) PO Box 1107 Haines, AK 99827 Gold—Silver Porcupine Creek Juneau district ML 2700	Anchorage, AK 99516 Gold—Silver Windy Creek Valdez Creek district ML 5560	Surprise Mining Co. (SCR) Aubrey, Larson, Staggs PO Box 11700 Chickaloon, AK 99674-1170 Gold—Silver Glass Creek Hatcher Pass district ML 5727	Taiga Mining Co. Inc. (WR) 4740 E. 115th Ave. Anchorage, AK 99516 Gold—Silver Dry Creek Koyukuk—Hughes district ML 9388
Secon Inc. (SER) 10505 NE 38th Pl. Kirkland, WA 98033 Sand and Gravel Lena Point Juneau district ML 99070	Nome, AK 99762 Rock Cape Nome Cape Nome district ML 991020, 99126	Swarthout, Ralph PO Box 141801 Anchorage, AK 99514-1801 Not given Not given Unknown district ML 5649	Tallini, Roger P. (EIR) PO Box 3474 Flagstaff, AZ 86003-3474 Gold—Silver South Fork Fortymile River Fortymile district ML 9028
Seuffert, George Jr. (EIR) 7705 Port Orford Dr. Anchorage, AK 99516 Gold—Silver Jack Wade Creek Fortymile district ML 9401	Stebbins, AK 99671 Gravel, sand, and stone Unidentified Candle district ML 99011	Swenson, Lloyd D. (EIR) 1843 Bridgewater Dr. Fairbanks, AK 99709 Gold—Silver Slate Creek Rampart district ML 7343	Tatlow Carl D. & Janice L. (SCR) PO Box 1621 Palmer, AK 99645 Gold—Silver Peters Creek Yentna district ML 5736
Shilling, John A. (EIR) PO Box 81424 Fairbanks, AK 99708-1424 Gold—Tin Thanksgiving Creek Hot Springs district ML 7503	Stec, Russell E./Larry Fine (WR) PO Box 940316 Houston, AK 99694-0316 Gold—Silver East Fork Iron Creek Solomon district ML 6491	Swenson, Richard A. (EIR) PO Box 16205 Two Rivers, AK 99716-6205 Gold—Silver Doric Creek Hot Springs district ML 6872	Taylor, Larry R. (EIR) PO Box 101 Eagle, AK 99738-0101 Gold—Silver Fortymile River Fortymile district ML 9179
Silverado Mines (U.S.) Inc. (NR) PO Box 83730 Fairbanks, AK 99708-3730 Gold—Antimony Nolan Creek Koyukuk—Nolan district ML 7084	Stein, Robert D. (EIR) 105 Dunbar Ave. Fairbanks, AK 99701 Gold—Silver Gilmore Creek Fairbanks district ML 5909	Swenson, Richard (EIR) PO Box 16205 Two Rivers, AK 99716-6205 Gold—Silver Eureka Creek Hot Springs district ML 9473	Teslin Mining Co. (NG) PO Box 1989 Nome, AK 99762 Not given Not given Unknown district ML 9436
Skookum Mining (EIR) PO Box 10139 Fairbanks, AK 99710-0139 Gold—Silver Portage Creek Bonnifield district ML 8875	Sternberg, Tom (NG) 3154 E. 19th Ct. Anchorage, AK 99508 Unknown commodity Unknown district ML 5725	Tachik, Wayne H. (EIR) PO Box 3503 Soldotna, AK 99669-3503 Gold—Silver Moose Creek Bonnifield district ML 6719	The Gravel Station (SCR) Turner PO Box 3489 Palmer, AK 99645-3489 Sand and Gravel Hornung Property Hatcher Pass district ML 99013
Smith, William L. (SCR) 906 Cunningham St. Anchorage, AK 99501 Gold—Silver Silvertip Creek Seward district ML 6054	Stough, Richard B. (EIR) PO Box 711 Wrangell, AK 99929-0711 Gold—Silver Dome Creek Fairbanks district ML 4277	Taiga Mining Co. Inc. (WR) 4740 E. 115th Ave. Anchorage, AK 99516 Gold—Silver Clear Creek Koyukuk—Hughes district ML 9017	Thompson, Kevin (SCR) PO Box 875534 Wasilla, AK 99687-5534 Gold—Silver Gold Hill above White Creek Valdez Creek district ML 5729
Snyder, Donald L. (EIR) PO Box 54 Chicken, AK 99732 Gold—Silver South Fork Fortymile River Fortymile district ML 1482	Stultz, Donald D. (EIR) PO Box 700 Nome, AK 99762 Gold—Silver Oregon Creek Cape Nome district ML 5983	Taiga Mining Co. Inc. (WR) 4740 E. 115th Ave. Anchorage, AK 99516 Gold—Silver Bear and Ida creeks Koyukuk—Hughes district ML 9139	Thurman Oil & Mining Inc. (EIR) 925 Aurora Dr. Fairbanks, AK 99709 Gold—Silver Rhode Island Creek Hot Springs district ML 9125
Soule, Harold L. (SCR) 2840 E. 142nd Ave.	Surf Food Products, Inc. (AP) 7716 97th Ave. SW Tacoma, WA 98498 Gravel—Rock Kodiak district ML 5731, 9404		

Thurman Oil & Mining Inc. (WR) 925 Aurora Dr. Fairbanks, AK 99709 Gold-Silver Quartz 7 and Dahl creeks Candle district ML 9398	Vogt, Ray A. (NG) 4200 Elliott Hwy. Fairbanks, AK 99712 Not given Not given Unknown district ML 7021	Wiggers, Dan A. (NR) HC 30 Box 5283 Wasilla, AK 99654 Gold-Silver Hammond River Koyukuk-Nolan district ML 6859	Big Lake, AK 99652 Gold-Silver Falls Creek Unknown district ML 99108
Tileson Mining (EIR) PO Box 55823 North Pole, AK 99705-5823 Gold-Silver California Creek Bonnifield district ML 9192	Voytilla, Earl W. (EIR) PO Box 58901 Fairbanks, AK 99710 Gold-Silver Tenderfoot Richardson district ML 5868	Wilde, Jim & Lore (EIR) PO Box 30068 Central, AK 99730 Gold-Silver Switch Creek Circle district ML 5998	Wishbone Sand & Gravel (SCR) Robert A. Navrot PO Box 252 Sutton, AK 99674 Sand and Gravel Anchorage district ML 99130
Toohey, Cynthia (SCR) PO Box 113 Girdwood, AK 99587-0113 Gold-Silver Crow Creek Anchorage district ML 5564	Walton, Ross (EIR) 1247 Hartzog Lp. North Pole, AK 99705 Gold-Silver Dome Creek Fairbanks district ML 5847	Wilder, Richard (EIR) 117 Elray St. Fairbanks, AK 99709 Gold-Silver Little Boulder Hot Springs district ML 5939	Wolf, Ray (EIR) 30033 Redwood Highway Cave Junction, OR 97523 Gold-Silver North Fork Harrison River Circle district ML 9363
Treesh, James W. (SCR) 18550 Man O'War Rd. Eagle River, AK 99577 Gold-Silver No Name Creek Hope-Sunrise district ML 9384	Watts, Donald (EIR) PO Box 81515 Fairbanks, AK 99708 Gold-Silver Grubstake Creek Bonnifield district ML 5865	Wilkinson, Fred D. (EIR) PO Box 1 Central, AK 99730 Gold-Silver Ketchem Creek Circle district ML 5997	Wolff, Flint, L. (EIR) Box BYA Tok, AK 99780 Gold-Silver Walker Fork Fortymile district ML 99048
Treider, Eric (NG) PO Box 8138 Nikiski, AK 99635 Not given Not given Unknown district ML 5748	Weathers, Douglas & Edith (SCR) PO Box 8082 Nikiski, AK 99635-8082 Gold-Silver Cache Creek Yentna district ML 6209	Willard, Gerald L. (NG) PO Box 875532 Wasilla, AK 99687 Unknown commodity Unknown district ML 5724	Wolff, Gordon C. (SCR) 618 W. 86th Ct. Anchorage, AK 99515 Gold-Silver Peters Creek Yentna-Cache Creek district ML 8083
Trinity Mining (WR) Cheryl Jong PO Box 372 Kotzebue, AK 99752 Gold-Silver Washington Creek Kougarok district ML 5844	Wegley, Mike & Jean (NG) 71297 N. Shore Dr. Birkenfield, OR 97016 Not given Not given Unknown district ML 9453	Willford, Frank (EIR) 1079 Victor St. North Pole, AK 99705 Gold-Silver Tributary to Hoosier Creek Rampart district ML 7358	Wood, James (WR) PO Box 58597 Fairbanks, AK 99711-8597 Gold-Silver Little Boulder Creek Cape Nome district ML 6953
TruDeck Mining (EIR) PO Box 135 Healy, AK 99743-0135 Polymetallic Sheep Creek Bonnifield district ML 9369	Western Mining Corp. (NG) 4750 Longley Lane, Suite 106 Reno, NV 89502 Not given Various Unknown district ML 5750	Willis, Dean L. (EIR) PO Box 30063 Central, AK 99730-0063 Gold-Silver Crooked Creek Circle district ML 5929	Wrede, Ron (EIR) 2116 NE 80 Seattle, WA 98115 Gold-Silver Switch Creek Circle district ML 9049
Ventures Resources Alaska Corp. (NG) PO Box 100059 Anchorage, AK 99510-0059 Base-Precious metals Various Unknown district ML 5743	Wicken, James T. (NR) 1709 Central Ave. Fairbanks, AK 99709 Gold Gold Creek Koyukuk-Nolan district ML 5947	Wilmarth, Richard C. (SWR) PO Box 33 Red Devil, AK 99656 Gold-Silver Chicken Creek Iditarod district ML 6351	Wright, Richard L. (NR) 3410 Tilleson Way North Pole, AK 99705 Gold-Silver Gold Creek Koyukuk-Nolan district ML 9085
		Winslow, Jeffery A. (NG) PO Box 521564	Wright, Robert P. (EIR) PO Box 60783 Fairbanks, AK 99706-0783 Gold-Silver

Last Chance Creek
Fairbanks district
ML 9155

Wyka, Wayne (EIR)
PO Box 74051
Fairbanks, AK 99707
Gold—Silver
Fortymile Creek
Fortymile district
ML 9477

Yellow Eagle Mining Inc. (EIR)

PO Box 80566
Fairbanks, AK 99708
Gold—Silver
Ester and Cripple creeks
Fairbanks district
ML 9127

Yutan Construction Co. (EIR)

PO Box 71775
Fairbanks, AK 99707

Rock

Browns Hill
Fairbanks district
ML 99026

Zimmer, George W. (WR)

PO Box 140174
Anchorage, AK 99514-0174
Gold—Silver
Quartz Creek

Koyukuk district
ML 5555

Zimmerman, Charles J. (EIR)

PO Box 41
Manley Hot Springs, AK 99756
Gold—Silver
Killarney Creek
Hot Springs district
ML 9392

APPENDIX D

Selected significant mineral deposits and mineral districts in Alaska^a

The alphabetized list of mineral deposits and mineral districts is keyed to the list of explanatory paragraphs that follow. For example, The Lik deposit in the alphabetized list is "Lik, 1, (fig. D-1)." This says that the location of Lik is shown as number 1 in figure D-1.

Alaska-Juneau, 100, (fig. D-3).
 Anderson Mountain, 54, (fig. D-1).
 Apex-El Nido, 104, (fig. D-3).
 Apollo-Sitka mines, 86, (fig. D-3).
 Arctic, 9, (fig. D-1).
 Avan Hills, 12, (Fig. D-3).
 Baulstoff, 75, (fig. D-2).
 Bear Mountain, 21, (fig. D-2).
 Big Creek/Ladue, 58, (fig. D-1).
 Big Hurrah, 32, (fig. D-3).
 Binocular and other prospects, 72, (fig. D-1).
 Bohemia Basin, 103, (fig. D-3).
 Bokan Mountain, 122, (fig. D-3).
 Bonanza Creek, 45, (fig. D-2).
 Bond Creek, 73, (fig. D-2).
 Bonnifield district massive sulfide deposits, 54, (fig. D-1).
 Bornite, 8, (fig. D-1).
 Brady Glacier, 98, (fig. D-3).
 BT, 54, (fig. D-1).
 Buck Creek, 23, (fig. D-2).
 Cape Creek, 22, (fig. D-2).
 Carl Creek, 74, (fig. D-2).
 Casca VABM, 53, (fig. D-1).
 Castle Island, 111, (fig. D-1).
 Chandalar mining district, 17, (fig. D-3).
 Chichagof, 101, (fig. D-3).
 Chistochina, 68, (fig. D-3).
 Circle mining district, 52, (fig. D-3).
 Claim Point, 82, (fig. D-3).
 Coal Creek, 63, (fig. D-2).
 Copper City, 119, (fig. D-1).
 Cornwallis Peninsula, 110, (fig. D-1).
 Council mining district, 33, (fig. D-3).
 Delta massive sulfide belt, 55, (fig. D-1).
 Denali prospect, 67, (fig. D-1).
 Dolphin, 49e, (fig. D-3).
 Donlin Creek-Chevak district, 84, (fig. D-3).
 Drenchwater, 3, (fig. D-1).
 Dry Creek, 54, (fig. D-1).
 Ear Mountain, 25, (fig. D-2).
 Ellamar, 78, (fig. D-1).
 Ernie Lake (Ann Creek), 15, (fig. D-1).
 Esotuk Glacier, 20, (fig. D-2).
 Fairbanks mining district, 49, (fig. D-3).
 Fairhaven/Innachuk district, 39, (fig. D-3).
 Fort Knox, 49a, (fig. D-3).
 Forty-mile mining district, 60, (fig. D-3).
 Frost, 7a, (fig. D-1).
 Funter Bay mining district, 99, (fig. D-3).
 Galena Creek, 21a, (fig. D-1).
 Ginny Creek, 4, (fig. D-1).
 Golden Zone mine, 64, (figs. D-1, D-3).
 Goodnews Bay, 85, (fig. D-3).
 Grant Mine, 49c, (fig. D-3).
 Greens Creek, 105, (fig. D-1).
 Groundhog Basin, 112, (fig. D-1).
 Haines Barite, 95, (fig. D-1).
 Hannum, 27, (fig. D-1).
 Hirst Chichagof, 101, (fig. D-3).
 Horsfeld, 76, (fig. D-2).
 Hot Springs mining district, 47, (fig. D-3).
 Hyder mining district, 117, (figs. D-1, D-2).
 Iditarod district, 43a, (fig. D-3).
 Illinois Creek, 44a, (fig. D-1).
 Independence, 79, (fig. D-3).
 Independence Creek, 28, (fig. D-1).
 Innachuk River, 39, (fig. D-3).
 Innoko-Tolstoi mining district, 43b, (fig. D-3).
 Ivanof, 88, (fig. D-2).
 Jimmy Lake, 94, (fig. D-1).
 Johnson River, 125, (fig. D-3).
 Jualin, 128, (fig. D-3).
 Jumbo, 118, (fig. D-1).
 Kachauik, 34, (fig. D-3).
 Kantishna mining district, 61, (fig. D-3).
 Kasaaan Peninsula, 114, (fig. D-1).
 Kasna Creek, 92, (fig. D-1).
 Kemuk Mountain, 123, (fig. D-3).
 Kennecott deposits, 71, (fig. D-1).
 Kensington, 127, (fig. D-3).
 Kivliktort Mountain, 5a, (fig. D-1).
 Klery Creek, 14, (fig. D-3).
 Klukwan, 96, (fig. D-3).
 Kougak Mountain, 26, (fig. D-2).
 Koyukuk-Hughes mining district, 42, (fig. D-3).
 Koyukuk-Nolan mining district, 16, (fig. D-3).
 Latouche, Beatson, 80, (fig. D-1).
 Liberty Belle, 54, (fig. D-1).
 Lik, 1, (fig. D-1).
 Livengood-Tolovana mining district, 48, (fig. D-3).
 Lost River, 24, (fig. D-2).
 Lucky Shot, 79, (fig. D-3).
 McLeod, 124, (fig. D-2).
 Mertie Lode, 99, (fig. D-3).
 Midas mine, 77, (fig. D-1).
 Mike deposit, 90, (fig. D-2).
 Mirror Harbor, 102, (fig. D-3).
 Misheguk Mountain, 13, (fig. D-3).
 Mosquito, Peterne, 56, (fig. D-2).
 Mt. Prindle, 50, (fig. D-3).
 Nabesna mine, 69, (fig. D-3).
 Niblack, 121, (fig. D-1).
 Nim prospect, 65, (fig. D-1).
 Nimiuktuk River, 126, (fig. D-1).
 Nixon Fork, 44, (fig. D-3).
 Nome mining district, 30, (fig. D-3).
 Nunatak, 97, (fig. D-2).
 Omalik, 35, (fig. D-1).
 Omar, 7, (fig. D-1).
 Orange Hill, 73, (fig. D-2).
 Pebble Copper, 129, (fig. D-1).
 Placer River, 38, (fig. D-2).
 Pleasant Creek, 53, (fig. D-1).
 Pogo, 130, (fig. D-3).
 Poovookpuk Mountain, 40, (fig. D-2).
 Porcupine Lake, 18, (fig. D-2).
 Purcell Mountain, 41, (fig. D-2).
 Pyramid, 87, (fig. D-2).
 Quartz Creek, 37, (fig. D-1).
 Quartz Hill, 120, (fig. D-2).
 Red Bluff Bay, 109, (fig. D-3).
 Red Devil, 83, (fig. D-3).
 Red Dog, 2, (fig. D-1).
 Red Mountain, 82, (fig. D-3).
 Rex deposit, 91, (fig. D-2).
 Rock Creek, 31, (fig. D-3).
 Rua Cove, 81, (fig. D-1).
 Ruby mining district, 46, (fig. D-3).
 Ryan Lode, 49b, (fig. D-3).
 Salt Chuck, 115, (fig. D-3).
 Sheep Creek, 54, (fig. D-1).
 Sinuk River region, 29, (fig. D-1).
 Slate Creek, 59, (fig. D-3).
 Sleit Mountain, 93, (fig. D-2).
 Smucker, 11, (fig. D-1).
 Snettisham, 107, (fig. D-3).
 Snipe Bay, 113, (fig. D-3).
 Solomon mining district, 33, (fig. D-3).
 Spirit Mountain, 70, (fig. D-3).
 Stampede mine, 62, (fig. D-3).
 Story Creek, 5, (fig. D-1).
 Sumdum, 106, (fig. D-1).
 Sun, 10, (fig. D-1).
 Taurus, 57, (fig. D-2).
 Three Castle Mountain, 53, (fig. D-1).
 Tracy Arm, 108, (fig. D-1).
 True North, 49d, (fig. D-3).
 Twin Mountain, 51, (fig. D-2).
 Union Bay, 116, (fig. D-3).
 Valdez Creek district, 66, (fig. D-3).
 Vinasale Mountain, 44b, (fig. D-3).
 Virginia Creek, 54, (fig. D-1).
 Von Frank Mountain, 44c, (fig. D-3).
 War Baby, 79, (fig. D-3).
 Weasel Mountain, Bee Creek, 89, (fig. D-2).
 Whoopie Creek, 6, (fig. D-1).
 Willow Creek, 79, (fig. D-3).
 Wind River, 19, (fig. D-1).
 Windy Creek, 36, (fig. D-2).
 Zackly, 67a, (fig. D-1).

^aThis generalized summary does not describe all of the known 6,400 mineral deposits in Alaska.

NOTE: In cooperation with DGGS and the Russian Academy of Sciences, the USGS published Open-File Report 93-339 (Nokleberg and others, 1993), *Metallogenesis of mainland Alaska and the Russian northeast*, which describes 273 lode deposits and 43 significant placer districts in Alaska.

Figure D-1. Significant copper, lead, zinc with credits of silver, gold, and barite deposits in Alaska, 1997.

Map no.

- 1 **Lik**—Major strata-bound massive sulfide (Zn–Pb–Ag–Ba) deposit in black shale and chert. Proven reserve (Lik) estimate of 21.77 million tonnes (24 million tons) of 9% Zn, 3.1% Pb, and 48 g/tonne (1.4 oz/ton) Ag (fig. D-1).
- 2 **Red Dog**—At least three major strata-bound massive sulfide deposits hosted in Pennsylvanian or Mississippian shale; similar to locality 1. (a) The Main Deposit at Red Dog contains 55.8 million tons of measured and indicated ore grading 19.0% Zn, 5.2% Pb, with 2.9 oz/ton Ag. (b) The Aqqaluk Deposit contains 80.4 million tons grading 13.6% Zn, 3.7% Pb, and 1.9 oz/ton Ag. (c) The Hilltop Deposit with an inferred reserve is 10.6 million tons grading 17.8% Zn, 5.5% Pb, and 3.42 oz/ton Ag. Resource in the Paalaaq deposit is 15.5 million tons of 14.3% Zn, 3.9% Pb, and 2.42 oz/ton Ag. (fig. D-1).
- 3 **Drenchwater**—Mississippian and Pennsylvanian shales and cherts contain three strata-bound base metal occurrences

spatially related to acid volcanics. The lowest unit, a siliceous mudstone, contains a 0.6 m (2-ft) layer with up to 23% Zn. An overlying gray chert contains up to 11% Zn and up to 5% Pb with some Ag in fracture fillings. At the top of the overlying tuffaceous layer, Ag-bearing Zn and Pb mineralization outcrops discontinuously for at least 1,982 m (6,500 ft), and contains up to 26% Zn and 51% Pb in grab samples (fig. D-1).

- 4 **Ginny Creek**—Epigenetic, disseminated Zn–Pb–Ag deposits with barite in sandstone and shale of Noatak Sand-stone of Late Devonian through Early Mississippian age. Random grab samples of surface float contain 0.3% to 3.0% Zn and highly variable amounts of Pb and Ag (fig. D-1).
- 5 **Story Creek**—Epigenetic replacement deposits of Zn–Pb–Ag–Cu–Au hosted in brecciated zones in Devonian Kanayut



Figure D-2. Significant molybdenum-copper and tin-tungsten with credits of fluorite and beryllium deposits in Alaska, 1997.

Conglomerate or Lower Mississippian Kayak Shale. Grab samples of high-grade material contain up to 0.43% Cu, 34% Pb, 28.8% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 1,028 g/tonne (30 oz/ton) Ag (fig. D-1).

5a **Kivliktort Mountain**—Mineralized float is widespread on the north flanks of the mountain, apparently spatially related to the contact between shales at the base of the hills and coarse-grained siliceous clastic rocks on the upper slopes. Rock samples containing up to 30% Zn have been reported (fig. D-1).

6 **Whoopee Creek**—Epigenetic replacement deposits of Zn-Pb-Cu-Ag-Au-Cd in breccia zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Ran-dom grab samples of mineralized material contain 0.24% Cu, 0.37% Cd, 46% Zn, 44% Pb, 4.8 g/tonne (0.14 oz/ton) Au, and 507 g/tonne (14.8 oz/ton) Ag (fig. D-1).

7 **Omar**—Epigenetic replacement deposits of Paleozoic age; include bedded barite occurrences. Grab samples contain 15.3% Cu, 0.15% Pb, 0.95% Zn, 0.05% Co, and 10 g/tonne

(0.3 oz/ton) Ag. BLM estimates 35 million tons of 4% Cu (fig. D-1).

7a **Frost**—Possible 8.2 million tonnes (9 million tons) barite in pods, lenses, and wavy-banded quartz-calcite-barite veins. Chalcopyrite and galena occur in the veins which cross cut Paleozoic limestone and dolomite for a minimum distance of 1.6 km (1 mi). Selected samples contain up to 13.2% Zn (fig. D-1).

8 **Bornite**—Major strata-bound Cu-Zn deposit in brecciated carbonate rock of Devonian age; 4.56 million tonnes (5.0 million ton) orebody contains 4.0% Cu and accessory Zn and Co. Larger reserve estimate of 36.2 million tonnes (40 million tons) of about 2% Cu and undisclosed amount of Zn and Co. At grade of 1.2% Cu, reserves are 91 million tonnes (100 million tons) (fig. D-1).

9 **Arctic**—Major volcanogenic (Cu-Zn) massive sulfide deposit hosted in sequence of metarhyolite, metatuff, and graphitic schist of Devonian age; indicated reserves of 36.3 million



Figure D-3. Significant gold, silver, platinum, and strategic mineral deposits in Alaska, 1997.

tonnes (40 million tons) grade 4.0% Cu, 5.5% Zn, 0.8% Pb, 55 g/tonne (1.6 oz/ton) Ag, and 0.69 g/tonne (0.02 oz/ton) Au (fig. D-1).

10 **Sun**—Major (Cu–Pb–Zn–Ag) massive sulfide deposit in sequence of middle Paleozoic metarhyolite and metabasalt. Average grades are 1 to 4% Pb, 6 to 12% Zn, 0.5 to 7% Cu, 103 to 377 g/tonne (3 to 11 oz/ton) Ag (fig. D-1).

11 **Smucker**—Middle Paleozoic volcanogenic massive sulfide deposit; 915 m (3,000 ft) long and up to 58 m (190 ft) wide; contains significant tonnage of Cu–Pb–Zn ore that grades 1.5% Pb, 5 to 10% Zn, 103 to 343 g/tonne (3 to 10 oz/ton) Ag, with minor Au (fig. D-1).

12 **Avan Hills**—Disseminated chromite in layered ultramafic rocks; grab samples contain up to 4.3% Cr with 0.51 g/tonne (0.015 oz/ton) PGM (fig. D-3).

13 **Misheguk Mountain**—Chromite occurrences similar to those in Avan Hills (fig. D-3).

14 **Klery Creek**—Lode and placer Au deposits worked intermittently from 1909 through 1930s. Total production through 1931, mostly from placer deposits, estimated at 974 kg (31,320 oz) Au (fig. D-3).

15 **Ernie Lake (Ann Creek)**—Strata-bound massive sulfide occurrence in metarhyolite, metatuff, and marble. Gossan zones strongly anomalous in Cu–Pb–Zn and Ag (fig. D-1).

16 **Koyukuk–Nolan mining district**—Major placer Au district; from 1893 to 1995 produced an estimated 10,580 kg (340,152 oz) Au. Significant deep placer reserves remain (fig. D-3).

17 **Chandalar mining district**—Major Au producing district; substantial production in excess of 2,000 kg (64,367 oz) Au through 1995 from lode and placer sources; lode Au found in crosscutting quartz veins that intrude schist and greenstone. Active development of placer deposits and lodes in progress. Inferred lode reserves estimated to be 40,800 tonnes

(45,000 tons) with grade of 69 g/tonne (2 oz/ton) Au (fig. D-3).

18 **Porcupine Lake**—Stratiform fluorite occurrences and argentiferous enargite, tetrahedrite associated with felsic volcanic rocks of late Paleozoic age. Reported grades of up to 30% fluorite (CaF_2) reported, with grab samples of 4.8% Cu (fig. D-2).

19 **Wind River**—Strata-bound Pb–Zn massive sulfide prospects; reported grades of up to 5% Pb (fig. D-1).

20 **Esotuk Glacier**—Disseminated Mo–Sn–W–Pb–Zn mineralization in skarns associated with Devonian(?) schistose quartz monzonite. Grab samples contain up to 0.08% Sn and 0.15% W (fig. D-2).

21 **Bear Mountain**—Major stockwork Mo–W–Sn occurrence in intrusive breccia. Rock samples containing up to 0.8% Mo and 0.6% W occur within a 14 ha (35 acre) area where soil samples average more than 0.2% MoS_2 , and an adjacent 10 ha (25 acre) area where rubble contains wolframite has soils averaging greater than 0.12% WO_3 . Rubble crop in this area indicates a Tertiary porphyry system as the source of the Mo and W (fig. D-2).

21a **Galena Creek**—Steeply dipping veins contain up to 21% Cu, 3.5% Zn, and 1.3% Pb with 189 g/tonne (5.5 oz/ton) Ag on the east side of the creek, and on the ridge west of the creek a large area of disseminated mineralization and veinlets contains predominantly Zn (fig. D-1).

22 **Cape Creek**—Major placer Sn producer. More than 454 tonnes (500 tons) Sn produced from 1935 to 1941; from 1979 to 1990, produced 940 tonnes (1,040 tons) Sn. Derived from Cape Mountain in contact zone of Cretaceous granite and limestone (fig. D-2).

23 **Buck Creek**—Major placer Sn producer. More than 998 tonnes (1,100 tons) Sn produced from 1902 to 1953 (fig. D-2).

24 **Lost River**—Major Sn, fluorite, W, and Be deposit associated with Cretaceous Sn granite system. More than 317 tonnes (350 tons) Sn produced from skarn and greisen lode sources. Measured reserves amount to 22.3 million tonnes (24.6 million tons) that grade 0.15% Sn, 16.3% CaF_2 , and 0.03% WO_3 , based on 13,720 m (45,000 ft) of diamond drilling (fig. D-2).

25 **Ear Mountain**—Placer Sn district and Sn–Cu–Au–Ag–Pb–Zn skarn mineralization of Cretaceous age. Area also anomalous in U (fig. D-2).

26 **Kougarok Mountain**—Sn deposit hosted in quartz-tourmaline-topaz greisen of Cretaceous age. Grades may average 0.5% Sn and 0.01% Ta and Nb, but a high grade resource of 136,050 tonnes (150,000 tons) grading 1% + Sn has been identified, with incrementally higher tonnage at lower grades (fig. D-2).

27 **Hannum**—Stratiform, carbonate-hosted Pb–Zn–Ag massive sulfide deposit of mid-Paleozoic age in heavily oxidized zone that ranges from 9 to 46 m (30 to 150 ft) thick. Mineralized zone reported to assay up to 10% Pb, 2.2% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 60.3 g/tonne (1.76 oz/ton) Ag (fig. D-1).

28 **Independence Creek**—Pb–Zn–Ag massive sulfide deposit; high-grade ore shipped in 1921 contained 30% Pb, 5% Zn, up to 5,141 g/tonne (150 oz/ton) Ag. Mineralization restricted to shear zone in carbonates (fig. D-1).

29 **Sinuk River region**—Several Pb–Zn–Ag–Ba–F bearing massive sulfide deposits and layered Fe deposits in carbonate and metavolcanic rocks of Nome Group. Mineralized zones extend for over 2,440 m (8,000 ft) along strike (fig. D-1).

30 **Nome mining district**—Major placer Au producer. Production from 1897–1995 in excess of 151,600 kg (4,874,449 oz) Au all from placers. Sporadic Sb and W production in past (fig. D-3).

31 **Rock Creek**—About 10.0 million tons grading 2.5 g/tonne (0.072 oz/ton) Au in vein swarms and stringers in an area 457 m (1,500 ft) long, 152 m (500 ft) maximum width and 91 m (300 ft) deep (fig. D-3).

32 **Big Hurrah**—Epigenetic vein deposit in black slate and metasedimentary rocks of the Solomon schist. Deposit contains some W mineralization and has produced over 840 kg (27,000 oz) Au from nearly 45,350 tonnes (50,000 tons) milled ore. Proven, inferred, and indicated reserves total 94,328 tonnes (104,000 tons) that grade 21 g/tonne (0.61 oz/ton) Au, 19 g/tonne (0.55 oz/ton) Ag, and credits of WO_3 (fig. D-3).

33 **Solomon and Council mining districts**—Major placer Au districts; produced over 32,550 kg (1,046,513 oz) through 1995. Three structurally controlled Au deposits in Bluff area—Daniels Creek, Saddle, and Koyana Creek—contain minimum inferred reserves of 5.9 million tonnes (6.5 million tons) grading 3.4 g/tonne (0.1 oz/ton) Au (fig. D-3).

34 **Kachauik**—U prospect in Cretaceous alkalic intrusive rocks. Highly anomalous geochemical values and U concentrations of 1,000 ppm reported (fig. D-3).

35 **Omalik**—Vein-type Pb–Zn–Ag massive sulfide prospect in Paleozoic carbonate rocks; from 1881 to 1900, produced 363 tonnes (400 tons) of Pb–Zn ore that averaged about 10% Pb and 1,371 g/tonne (40 oz/ton) Ag. Grades of oxidized Zn ore reported to be up to 34% Zn (fig. D-1).

36 **Windy Creek**—Disseminated Mo–Pb–Zn mineralization in quartz veins and skarns with reported values as high as 0.15% Mo (fig. D-2).

37 **Quartz Creek**—Significant Pb–Zn–Ag mineralization; reported grades of 15% combined Pb–Zn and 343 g/tonne (10 oz/ton) Ag (fig. D-1).

38 **Placer River**—Significant Mo–F mineralization disseminated in intrusive rocks. Reported values of 0.2% Mo (fig. D-2).

39 **Fairhaven/Inmachuk district**—Placer deposits with 10,812 kg (347,671 oz) production from 1902–1995; significant reserves remaining in a large ancestral channel system. Large base metal sulfide concentrations and U values in concentrates (fig. D-3).

40 **Poovookpuk Mountain**—Porphyry Mo mineralization. Reported grades of up to 0.25% Mo (fig. D-2).

41 **Purcell Mountain**—Mo and Ag occurrences associated with Cretaceous alkalic igneous plutons, alaskite, and bostonite dikes (fig. D-2).

42 **Koyukuk–Hughes mining district**—Production of 7,211 kg (231,888 oz) Au from 1930 to 1995, mainly from Alaska Gold Company dredge at Hogatza; dredge reactivated in 1981, but deactivated in 1984, and reactivated again in 1990. Nonfloat mechanized operation on Utopia Creek produced significant amount of placer Au from 1930 to 1962 (fig. D-3).

43a **Iditarod district**—Major placer Au district; produced 48,560 kg (1,561,524 oz) Au through 1995. Significant reserves of lode Au and lode W at Golden Horn deposit Chicken Mountain, and other known lodes in region associated with shear zones and monzonite intrusive rocks of Late Cretaceous age (fig. D-3).

43b **Innoko–Tolstoi mining district**—Major placer Au district with significant lode Au–Sb–Hg potential; lode sources for placers are volcanic-plutonic complexes of Late Cretaceous and dike swarms that intrude Mesozoic flysch; mining district produced

21,965 kg (706,267 oz) Au through 1995 almost all from placer deposits. New discovery on Vinasale Mountain south of McGrath is Au–polymetallic deposit in monzonite stock (fig. D-3).

44 **Nixon Fork**—Promising Au–Cu deposits; Nixon Fork mine produced 1,851 kg (59,500 oz) Au from Late Cretaceous skarns associated with quartz monzonite–Devonian limestone contact zones. Underground mining resumed in October 1995 (fig. D-3).

44a **Illinois Creek**—Near-surface geologic resource is 5.76 million tonnes (6.35 million tons) at 2.4 g/tonne (0.070 oz/ton) gold and 51.47 g/tonne (1.5 oz/ton) silver (fig. D-1).

44b **Vinasale Mountain**—Intrusive-hosted gold deposit. Au mineralization is associated with arsenopyrite and pyrite and within zones of phyllitic and silicic alteration hosted within a 69 Ma quartz monzonite stock. Both disseminated and veinlet mineralization exist. An inferred reserve of 10.3 million tonnes (11.35 million tons) grading 2.4 g/tonne (0.07 oz/ton) has been identified by drilling (fig. D-3).

44c **Von Frank Mountain**—Au and very weak Cu mineralization are associated with chalcopyrite, pyrite, and rare molybdenite within a zone of quartz stockwork veining hosted in a 69 Ma quartz–diorite stock. The stock is a cupola of the larger Von Frank Pluton. Drill intercepts include thicknesses up to 429 feet with an average grade of 0.013 oz/ton Au. Higher grade intercepts include 0.035 oz/ton Au up to 135 ft. (fig. D-3).

45 **Bonanza Creek**—Skarn-type W mineralization along intrusive contact; no published information available (fig. D-2).

46 **Ruby mining district**—Placer Au–Sn district; produced more than 14,830 kg (476,751 oz) Au from 1931 to 1995; mining district also contains Pb–Ag prospects with grades reportedly as high as 2,811 g/tonne (82 oz/ton) Ag (fig. D-3).

47 **Hot Springs mining district**—Placer Au–Sn district; produced more than 17,685 kg (568,632 oz) Au and over 326,590 kg (720,000 lb) cassiterite through 1995. Includes Eureka and Tofty subdistricts (fig. D-3).

48 **Livengood–Tolovana mining district**—Placer Au district; produced more than 15,440 kg (496,417 oz) Au since discovery in 1914 to 1995. Substantial reserves remain mainly on Livengood Bench, a Pliocene ancestral channel (fig. D-3).

49 **Fairbanks mining district**—Nationally ranked Au-producing district; largest producer in Alaska. Produced about 249,500 kg (8,022,434 oz) Au from placer deposits (1902–1995). Major lode Au and lode Sb producer; produced more than 9,472 kg (304,548 oz) Au and over 1.8 million kg (4 million lb) Sb from veins and shear zones through 1990. Production of W exceeded 4,000 short ton units since 1915, all derived from skarn near Cretaceous quartz monzonite (fig. D-3).

49a **Fort Knox**—Disseminated Au deposit within granodiorite/quartz monzonite pluton near Fairbanks. Proven and probable reserves, open at depth, are 128,000 kg (4,200,000 oz) of gold in 158.3 million tonnes (174.5 million tons) of rock. Fairbanks Gold Mining Inc. mined 366,223 ounces in 1997 at a cash cost of \$170/oz (fig. D-3).

49b **Ryan Lode**—Based on a 0.51 g/tonne (0.015 oz/ton) cutoff, total reserves in the metasediment-hosted Ryan Lode and subparallel igneous-hosted Curlew Shear are 25,573 kg (822,200 oz) of Au in 13.2 million tonnes (14.6 million tons) of rock. A geologic resource of about 74,468 kg (2.4 million oz) occurs within the total shear zone system (fig. D-3).

49c **Grant Mine**—A series of subparallel Au–bearing quartz veins in the schist and quartzite of Ester Dome based on exploration in 1990. Indicated reserves on one vein system, the O’Dea, are 192,285 tonnes (212,000 tons) of 12 g/tonne (0.36 oz/ton) Au. Other similar vein systems have been identified within the property (fig. D-3).

49d **True North**—Au occurs in siderite–quartz veins in carbonaceous quartzite and schist within a terrane containing eclogitic rocks. The mineral inventory is 16.5 million tonnes (18.2 million tons) grading 2.47 g/tonne Au (0.072 oz/ton) Au for a contained 40,869 kg (1,314,000 oz) Au. Further exploration is expected to increase the reserve base (fig. D-3).

49e **Dolphin**—Recently recognized mineralized intermediate intrusion contains anomalous Au, As, Bi and Sb. Discovery hole in 1995 intercepted 100 m of 1.68 g/tonne (330 ft of 0.049 oz/ton) gold (fig. D-3).

50 **Mt. Prindle**—Significant U–rare-earth mineralization in Mesozoic alkaline igneous rocks. Rock geochemical values of up to 0.7% U; up to 15% rare-earth elements reported (fig. D-3).

51 **Twin Mountain**—Significant W mineralization associated with skarn development along contact zone of quartz monzonite stock of Cretaceous age (fig. D-2).

52 **Circle mining district**—Currently one of Alaska’s largest producing placer Au districts; produced 31,960 kg (1,027,607 oz) Au since discovery in 1893 to 1995. Has significant potential for Sn, W, and Au mineralization from variety of lode sources (fig. D-3).

53 **Three Castle Mountain, Pleasant Creek, Casca VABM**—Strata-bound Pb–Zn massive sulfide mineralization. Reported grades of up to 17% Zn and 2% Pb (fig. D-1).

54 **Bonnifield district massive sulfide deposits (Anderson Mountain, Dry Creek, Sheep Creek, Virginia Creek, BT, Liberty Belle)**—Significant volcanogenic Cu–Pb–Zn–Ag massive sulfide deposits of Devonian to Mississippian age in Bonnifield mining district. Potential for high-grade deposits reported. Includes Liberty Bell strata-bound Au–B deposit and mineralization in Sheep Creek; latter contains Sn as well as base metals (fig. D-1).

55 **Delta massive sulfide belt**—Contains at least 30 known volcanogenic massive sulfide deposits and occurrences. Grades from 0.3 to 1.1% Cu, 1.7 to 5.7% Zn, 0.5 to 2.3% Pb, 24 to 69 g/tonne (0.7 to 2.0 oz/ton) Ag, and 0.61 to 2.1 g/tonne (0.018 to 0.061 oz/ton) Au; estimated potential reserve of 34.6 million tonnes (40 million tons) for all deposits (fig. D-1).

56 **Mosquito, Peternie**—Porphyry Mo prospects of early Tertiary age; reported grades of up to 0.17% Mo (fig. D-2).

57 **Taurus**—Significant major porphyry Cu–Au prospect of Paleocene age. East Taurus Zone contains inferred reserves of 126 million tonnes (140 million tons) grading about 0.30% Cu and 0.34 g/tonne (0.01 oz/ton) Au, and 0.03% Mo (fig. D-2).

58 **Big Creek/Ladue**—Strata-bound Pb–Zn–Ag massive sulfide prospects in metavolcanic rocks (fig. D-1).

59 **Slate Creek**—At least 50 million tonnes (55 million tons) of 6.3%, high-quality chrysotile asbestos in serpentinized ultramafic rocks of Permian(?) age (fig. D-3).

60 **Fortymile mining district**—Major placer Au district. Produced over 16,640 kg (534,974 oz) placer and very minor lode Au since discovery in 1883 to 1995, the longest continuous production of gold (113 years) of any Alaskan mining district (fig. D-3).

61 **Kantishna mining district**—Major placer Au and lode Ag–Au–Pb–Zn–Sb–W district. Produced 3,089 kg (99,307 oz) placer and lode Au, about 9,549 kg (307,000 oz) lode Ag, and

2.3 million kg (5 million lb) Sb from shear zones and vein deposits hosted in metamorphic units of Yukon-Tanana terrane. Nearly 90 lode deposits have been identified; potential exists for significant Ag–Au–Pb–Zn resources. Metalliferous strata-bound base metal deposits occur in schist and quartzite (fig. D-3).

62 **Stampede mine**—Major Sb deposit; produced more than 1.42 million kg (3.5 million lb) Sb from large shear zone in polymetamorphic rocks of Yukon–Tanana terrane (fig. D-3).

63 **Coal Creek**—Greisen-hosted Sn–Cu–W deposit in "McKinley" age pluton (55 million-year-old). Reported reserves of 4.54 million tonnes (5 million tons) of ore that grade 0.28% Sn and 0.3% Cu with credits of W, Ag, and Zn (fig. D-2).

64 **Golden Zone mine**—Major Au–Cu–Ag deposits in Late Cretaceous breccia pipe and skarn deposits. Produced more than 49 kg (1.581 oz) Au, 268 kg (8,617 oz) Ag, and 19,051 kg (42,000 lb) Cu. On the basis of recent (1994) drilling, the Pipe, Bunkhouse, and Copper King deposits contain 12.1 million tonnes (13.3 million tons) grading 3.25 g/tonne (0.095 oz/ton) gold (figs. D-1 and D-3).

65 **Nim Prospect**—Porphyry Cu–Ag–Au deposit of Late Cretaceous age. Reported grades of up to 5.0% Cu and 309 g/tonne (9 oz/ton) Ag (fig. D-1).

66 **Valdez Creek district**—About 15,813 kg (508,454 oz) Au production through 1995. Cambior Alaska Inc., the largest placer mine in Alaska, operated in this district until September 1995 (fig. D-3).

67 **Denali Prospect**—At least six small, strata-bound Cu lodes in volcanic sedimentary rocks of Triassic age that may contain 4.54 million tonnes (5 million tons) ore that grade about 2% Cu with credits of Ag (fig. D-1).

67a **Zackly**—Disseminated copper and gold in a garnet-pyroxene skarn and marble. Reserves are estimated at 1.27 million tonnes (1.4 million tons) grading 2.6 percent Cu and 6.0 g/ton (0.175 oz/ton) Au (fig. D-1).

68 **Chistochina**—Porphyry Cu prospects of Tertiary age and placer Au district; produced more than 5,637 kg (181,261 oz) Au and small amount Pt from placer deposits (fig. D-3).

69 **Nabesna mine**—Classic high-grade Au skarn that envelopes quartz diorite of Jurassic(?) age; produced over 2,068 kg (66,500 oz) Au from about 79,816 tonnes (88,000 tons) of ore from 1930 to 1941 (fig. D-3).

70 **Spirit Mountain**—Massive and disseminated Cu–Ni mineralization in mafic-ultramafic complex (fig. D-3).

71 **Kennecott deposits**—Major stratiform Cu–Ag massive sulfide deposits localized near contact between Chitistone Limestone and Nikolai Greenstone of Triassic age; contained some of highest grade Cu lodes mined in North America. From 1911 to 1938, produced more than 544 million kg (1.2 billion lb) Cu and 311,028 kg (10 million oz) Ag from 4.35 million tonnes (4.8 million tons) ore. Some reserves remain (fig. D-1).

72 **Binocular and other prospects**—Kennecott-type Cu–Ag massive sulfide deposits (fig. D-1).

73 **Bond Creek–Orange Hill**—Two major porphyry Cu–Mo deposits of Late Cretaceous age; reported inferred reserves of 770 million tonnes (850 million tons) ore that grade 0.3 to 0.5% Cu and 0.03% Mo (fig. D-2).

74 **Carl Creek**—Porphyry Cu prospect in altered intrusive complex; similar to locality 73 (fig. D-2).

75 **Baultoff**—Porphyry Cu prospect in altered intrusive rocks; inferred reserves of 132 million tonnes (145 million tons) of 0.20% Cu similar to locality 73 (fig. D-2).

76 **Horsfeld**—Porphyry Cu prospect; similar to locality 73 (fig. D-2).

77 **Midas mine**—Significant strata-bound Cu (Ag–Au–Pb–Zn) massive sulfide deposit in volcanic sedimentary rocks of Tertiary Orca Group. Produced more than 1.5 million kg (3.3 million lb) Cu from 44,760 tonnes (49,350 tons) ore (fig. D-1).

78 **Ellamar**—Strata-bound Cu–Zn–Au massive sulfide deposit in sediment of Eocene(?) Orca Group. Produced more than 7.3 million kg (16 million lb) Cu, 1,596 kg (51,307 oz) Au, and 5,960 kg (191,615 oz) Ag from about 273,764 tonnes (301,835 tons) ore (fig. D-1).

79 **Willow Creek, Independence, Lucky Shot, War Baby**—Major lode Au (Ag–Cu–Pb–Zn–Mo) in veins that cut Mesozoic quartz diorite. Produced more than 18,860 kg (606,400 oz) Au from lode sources and about 1,729 kg (55,600 oz) Au from associated placer deposits (fig. D-3).

80 **Latouche, Beatson**—Major strata-bound Cu–Zn–Ag massive sulfide deposits in Orca Group sedimentary rocks and mafic volcanic rocks. Produced more than 93 million kg (205 million lb) Cu from 5.4 million tonnes (6 million tons) ore. Inferred reserves of 4.53 million tonnes (5 million tons) ore that grade 1% Cu, 1.5% Pb+Zn (fig. D-1).

81 **Rua Cove**—Major strata-bound Cu–Zn massive sulfide deposit in complex ore shoots enclosed in mafic volcanic rocks of Orca Group. Reported reserves of over 1 million tonnes (1.1 million tons) ore that grade 1.25% Cu (fig. D-1).

82 **Red Mountain and Claim Point**—Significant Cr occurrence associated with layered ultramafic complexes of Tertiary age at Red Mountain near Seldovia. More than 35,419 tonnes (39,951 tons) metallurgical-grade ore shipped through 1976; huge low-grade Cr resource may remain, of which 27 million tonnes (30 million tons) grade 5.1% Cr₂O₃ (fig. D-3).

83 **Red Devil**—Major Hg–Sb deposit; high-grade epithermal Hg–Sb deposit hosted in shear zones in Kuskokwim Group sedimentary rocks. More than 1.24 million kg (35,000 flasks) Hg produced from 68,025 tonnes (75,000 tons) ore (fig. D-3).

84 **Donlin Creek–Aniak district**—Significant placer Au district. Aniak mining district produced 17,680 kg (568,601 oz) Au from placer deposits, mainly from the Nyac and Donlin Creek areas. Gold–polymetallic deposits hosted in granite porphyry dikes and sills of Donlin Creek area recently estimated to contain 61 million tonnes (67 million tons) grading 3.4 g/tonne (0.099 oz/tonne) gold (fig. D-3).

85 **Goodnews Bay**—Major placer Pt district; estimated to have produced over 17,261 kg (555,000 oz) refined PGE metals from 1934 to 1976; one of the largest known PGE metal resources in United States. Possible resources of 45 million m³ (60 million yd³) of deep, PGE-bearing gravels remain. Lode source believed to be Alaskan-type zoned ultramafic complex of Jurassic or Cretaceous age. Possible significant offshore placer potential (fig. D-3).

86 **Apollo–Sitka mines**—Major lode Au deposits; produced more than 3,347 kg (107,600 oz) Au from ore that averaged about 7.5 g/tonne (0.22 oz/ton) Au. Inferred reserves are 678,440 tonnes (748,000 tons) grading 26 g/tonne (0.76 oz/ton) Au, 74 g/tonne (2.16 oz/ton) Ag, with base metal credits (fig. D-3).

87 **Pyramid**—Late Tertiary porphyry Cu–Mo deposit; inferred reserves of 113 million tonnes (125 million tons) ore that grade 0.4% Cu and 0.03% Mo reported (fig. D-2).

88 **Ivanof**—Late Tertiary porphyry Cu prospect; grades of up to 0.72% Cu reported. Potential for large tonnages (fig. D-2).

89 **Weasel Mountain, Bee Creek**—Porphyry Cu–Mo prospect of late Tertiary to Quaternary age; grades of up to 0.48% Cu and 0.035% Mo reported. Potential for moderate tonnages of low-grade mineralization (fig. D-2).

90 **Mike deposit**—Porphyry Mo prospect of late Tertiary age; grades of up to 0.21% Mo reported. Potential for large tonnages of low-grade Mo mineralization (fig. D-2).

91 **Rex deposit**—Porphyry Cu prospect similar to locality 90; grades of up to 0.3% Cu reported. Potential for moderate reserves of low-grade mineralization (fig. D-2).

92 **Kasna Creek**—Major stratiform Cu–Pb–Zn and skarn-sulfide deposits of Mesozoic age in mafic, volcanic, and sedimentary rocks; reported reserves of over 9,070,000 tonnes (10 million tons) ore that grade more than 1% Cu (fig. D-1).

93 **Sleitak Mountain**—High-grade east-west-trending, Sn–W–Ag topaz–quartz greisen system hosted in 59-million-year-old old binary granite and in hornfels. Zone up to 1,915 m (3,000 ft) long and 152 m (500 ft) wide. One drill-hole showed 26 m (85 ft) of 1.8% Sn, and 0.4% W. Inferred resources are 58 to 96 million kg (128 to 212 million lb) Sn in 26.3 million tonnes (29 million tons) ore (fig. D-2).

94 **Jimmy Lake**—Complex Cu–Ag–Sn mineralization of late Tertiary(?) age; reported grades of up to 3,599 g/tonne (105 oz/ton) Ag and 3% Cu (fig. D-1).

95 **Haines Barite**—Major stratiform Ba–Pb–Zn–Cu–Ag deposit in pillow basalt-dominated section of Paleozoic or Triassic age; consists of 15- to 18-m- (48- to 60-ft-) thick zone of 60% barite with upper zone [0.6 to 2.4 m (2 to 8 ft) thick] of massive sulfides that contain 2% Pb, 3% Zn, 1% Cu, up to 137 g/tonne (4 oz/ton) Ag, and 4 g/tonne (0.12 oz/ton) Au. Estimated to contain 680,250 tonnes (750,000 tons) of 65% barite with Zn and Ag credits (fig. D-1).

96 **Klukwan**—Major Fe–Ti deposits in zoned ultramafic complex of Mesozoic age; reported to contain 2.7 billion tonnes (3 billion tons) of material that contains 16.8% Fe and 1.6 to 3.0% Ti (fig. D-3).

97 **Nunatak**—Porphyry Mo deposit; reported reserves of 7.7 million tonnes (8.5 million tons) ore that grades 0.125% Mo and 117 millions tonnes (129 million tons) of 0.04% Mo (fig. D-2).

98 **Brady Glacier**—Major Ni–Cu deposit in layered gabbro–pyroxenite complex of Tertiary age. Proven reserves of 91 million tonnes (100 million tons) ore that grade 0.5% Ni, 0.3% Cu reported and about 0.03% Co; also contains PGE concentrations (fig. D-3).

99 **Mertie Lode and Funter Bay mining district**—Contains substantial reserves of lode Au mineralization. Past production totaled about 466 kg (15,000 oz) Au. Deposits also contain significant Ni–Cu and Pb–Zn–Ag mineralization. Funter Bay deposit contains reported reserves of 507,920 tonnes (560,000 tons) that grade 0.34% Ni, 0.35% Cu, and 0.15% Co in gabbro-pipe system (fig. D-3).

100 **Alaska–Juneau**—Major lode Au deposit that consists of 30- to 90-m- (100- to 300-ft-) wide zone that contains en echelon, Au-bearing quartz veins in metamorphic rocks; produced more than 109,482 kg (3.52 million oz) Au from 80 million tonnes (88.5 million tons) ore from 1893 to 1944. Reserves (all categories) of 96 million tonnes (105.7 million tons) of 1.7 g/tonne (0.05 oz/ton) Au remain (fig. D-3).

101 **Chichagof and Hirst Chichagof**—Major lode Au deposits in quartz veins that cut Mesozoic graywacke; produced more than 23,949 kg (770,000 oz) Au, most of which was produced at Chichagof Mine. Inferred leased reserves estimated to be 3,110 kg (100,000 oz) Au (fig. D-3).

102 **Mirror Harbor**—Ni–Cu mineralization in layered gabbro complex of Mesozoic age; reported proven reserves of 7,256 tonnes (8,000 tons) of 1.57% Ni and 0.88% Cu and reported inferred reserves of several million tons ore that grade 0.2% Ni and 0.1% Cu (fig. D-3).

103 **Bohemia Basin**—Major Ni–Cu–Co mineralization in layered mafic complex similar to locality 102; reported reserves of 20 million tonnes (22 million tons) ore that grade 0.33 to 0.51% Ni, 0.21 to 0.27% Cu, and 0.02% Co, all of which are recoverable with standard flotation technology (fig. D-3).

104 **Apex–El Nido**—Significant lode Au–W deposits that occur as crosscutting veins in graywacke; produced more than 1,555 kg (50,000 oz) Au (fig. D-3).

105 **Greens Creek**—Major sediment-hosted Pb–Zn–Cu–Ag–Au volcanogenic massive sulfide deposit of Devonian or Triassic age; most recent reserve estimate of the original orebody is 10 million tonnes (11.0 million tons) grading 4.1 g/tonne (0.12 oz/ton) Au, 456 g/tonne (13.3 oz/ton) Ag, 12.8% Zn, and 4.0% Pb. Additional reserves in the southwest orebody are 1.81 million tonnes (2.0 million tons) grading 13.5% Zn, 5.5% Pb, 9.25 g/tonne (0.27 oz/ton) Au, and 1,131 g/tonne (33 oz/ton) Ag. Total combined reserves and resources of the mine are estimated to be 16.34 million tonnes (18 million tons) (fig. D-1).

106 **Sumdum**—Volcanogenic Cu–Pb–Zn massive sulfide deposit in Mesozoic metamorphic complex with potential strike length of over 3,048 m (10,000 ft). Inferred reserves of 24 million tonnes (26.7 million tons) ore that grade 0.57% Cu, 0.37% Zn, and 10 g/tonne (0.3 oz/ton) Ag reported (fig. D-1).

107 **Snettisham**—Fe–Ti deposit in mafic zoned intrusive complex; reported grades of about 18.9% Fe and 2.6% Ti (fig. D-3).

108 **Tracy Arm**—Strata-bound Cu–Zn–Pb massive sulfide prospect in Mesozoic schist; over 335 m (1,100 ft) long and up to 3.7 m (12 ft) thick. Reported grades of 1.5% Cu, 3.9% Zn, 26 g/tonne (0.76 oz/ton) Ag, and 0.44 g/tonne (0.013 oz/ton) Au (fig. D-1).

109 **Red Bluff Bay**—Significant chrome mineralization in Mesozoic ultramafic complex (probably ophiolite); reported reserves of 517 tonnes (570 tons) of material that grade 40% Cr and 26,303 tonnes (29,000 tons) that grade 18 to 35% Cr (fig. D-3).

110 **Cornwallis Peninsula**—Volcanogenic Cu–Pb–Zn–Ag–Ba massive sulfide deposit of Triassic(?) age; reported grades of up to 20% Pb–Zn and 788 g/tonne (23 oz/ton) Ag (fig. D-1).

111 **Castle Island**—Stratiform barite deposit of Triassic age hosted in carbonate and pillow basalt; about 776,390 tonnes (856,000 tons) of raw and refined barite produced from 1963 to 1980; also contains Zn, Pb, and Cu sulfides. Reported to be mined out (fig. D-1).

112 **Groundhog Basin**—Area contains several massive sulfide prospects in Mesozoic schist and gneiss whose origins are now thought to be plutonic associated. Reported grades of up to 8% Pb, 994 g/tonne (29 oz/ton) Ag, and 17 g/tonne (0.5 oz/ton) Au. Sn has also been recently identified. Area also contains potential for porphyry Mo deposits (fig. D-1).

113 **Snipe Bay**—Ni–Cu deposit in zoned mafic-ultramafic complex; inferred reserves of 390,000 tonnes (430,000 tons) of 0.3% Ni, 0.3% Cu, and 4.4 g/tonne (0.13 oz/ton) Ag reported (fig. D-3).

114 **Kasaan Peninsula**—Major skarn-type Cu–Fe–Au massive sulfide deposit of Jurassic age; area has produced over 12.7 million kg (28 million lb) Cu, and 1,711 kg (55,000 oz) Ag. Reported reserves of 3.6 million tonnes (4 million tons) ore that grade 50% Fe and less than 2% Cu (fig. D-1).

115 **Salt Chuck**—Cu–PGM–Ag–Au deposit in contact zone between pyroxenite and gabbro within Alaskan-type zoned mafic-ultramafic pluton. From 1900 to 1941, 2.3 million kg (5 million lb) Cu, over 622 kg (20,000 oz) PGM, and Au and Ag credits were produced from 294,775 tonnes (325,000 tons) ore (fig. D-3).

116 **Union Bay**—Significant Fe–Ti mineralization in ultra-mafic complex; area also contains Pt and V concentrations (fig. D-3).

117 **Hyder mining district**—Area produced more than 22,675 tonnes (25,000 tons) high-grade W–Cu–Pb–Zn–Ag ore from 1925 to 1951 from crosscutting ore shoots in Texas Creek granodiorite of Tertiary age. Area also contains potential for porphyry Mo–W mineralization and massive sulfide–skarn Pb–Ag–Au–W deposits (figs. D-1 and D-2).

118 **Jumbo**—Cu–Fe–Mo–Ag skarn deposit; produced more than 4.5 million kg (10 million lb) Cu, 8,708 kg (280,000 oz) Ag, and 218 kg (7,000 oz) Au from 113,375 tonnes (125,000 tons) ore. Zoned magnetite–Cu skarns are associated with epizonal granodiorite pluton of Cretaceous age. Reported reserves of 589,550 tonnes (650,000 tons) ore that grade 45.2% Fe, 0.75% Cu, 0.3 g/tonne (0.01 oz/ton) Au, and 2.74 g/tonne (0.08 oz/ton) Ag (fig. D-1).

119 **Copper City**—Stratiform Cu–Zn–Ag–Au massive sulfide deposit hosted in late Precambrian or earliest Paleozoic Wales Group. Reported grades of up to 12.7% Cu, 2.7% Zn, 86 g/tonne (2.5 oz/ton) Ag, and 6.9 g/tonne (0.2 oz/ton) Au (fig. D-1).

120 **Quartz Hill**—A porphyry molybdenum deposit hosted in a 25-million-year-old composite felsic pluton. Probable reserves, according to Cominco, are 210 million tonnes (232 million tons) with a grade of 0.22% MoS₂, and possible reserves are 1.1 billion tonnes (1.2 billion tons) with 0.12% MoS₂ (fig. D-2).

121 **Niblack**—Volcanogenic Cu–Pb–Au–Ag massive sulfide deposit hosted in Precambrian(?) Wales Group or Ordovician to Silurian Descon Formation; produced more than 635,000 kg (1.4 million lb) Cu, 342 kg (11,000 oz) Au, and 467 kg (15,000 oz) Ag. Current resource is 2.78 million tons at 3.3% Zn, 1.7% copper, 1.14 oz/ton silver and 0.087 oz/ton gold. The deposit is open to expansion (fig. D-1).

122 **Bokan Mountain**—Numerous U–Th prospects associated with Jurassic peralkaline intrusive complex; from 1955 to 1971, produced more than 108,840 tonnes (120,000 tons) ore that graded about 1% U₃O₈. Contains inferred reserves of about 36.2 million tonnes (40 million tons) of 0.126% Nb and up to 1% REE metals (fig. D-3).

123 **Kemuk Mountain**—Magmatic Fe–Ti deposit hosted in Cretaceous(?) pyroxenite. Inferred reserves of 2.17 billion tonnes (2.4 billion tons) that average 15 to 17% Fe, 2 to 3% TiO₂, and 0.16% P₂O₅ (fig. D-3).

124 **McLeod**—Porphyry Mo deposit that contains quartz–molybdenite fissure veins in quartz–feldspar porphyry. Chip samples contain up to 0.09% Mo (fig. D-2).

125 **Johnson River**—Epigenetic(?) quartz–sulfide stockwork or massive sulfide deposit hosted in volcaniclastic, pyroclastic, and volcanic rocks of Jurassic Talkeetna Formation. Deposit has drilled-out reserves at a \$50/tonne cutoff with no cut of high Au assays, 997,542 tonnes (1,099,580 tons) grading 10.35 g/tonne (0.32 oz/ton) Au, 7.84 g/tonne (0.24 oz/ton) Ag, 0.76% Cu, 1.17 Pb, and 8.37% Zn (fig. D-3).

126 **Nimiuktuk River**—Small hill of massive, high-grade barite estimated to contain at least 1.36 million tonnes (1.5 million tons) barite. Widespread stream-sediment Ba anomalies in area indicate further barite potential (fig. D-1).

127 **Kensington**—Stockworks of quartz veins in sheared and chloritized quartz diorite produced 9,886 tonnes (10,900 tons) grading 6 g/tonne (0.18 oz/ton) Au prior to 1930. Recent reserve estimates indicate at least 10.4 million tonnes (11.5 million tons) grading 4.9 g/tonne (0.143 oz/ton) Au. Subparallel Horrible vein system contains 3.56 million tonnes (3.93 million tons) grading 3.7 g/tonne (0.11 oz/ton) Au (fig. D-3).

128 **Jualin**—Five quartz–fissure veins in Cretaceous quartz diorite, more than 4,573 m (15,000 ft) of underground workings; produced 1,505 kg (48,387 oz) Au, mainly prior to 1930. Reserves estimated at 0.97 million tonnes (1.07 million tons) of 12 g/tonne (0.349 oz/ton) Au (fig. D-3).

129 **Pebble Copper**—Cu–Au porphyry with identified resource of 1 billion tons grading 0.30% Cu and 0.35 g/tonne (0.010 oz/ton) Au with Mo in the 0.03 to 0.04% range (fig. D-1).

130 **Pogo**—Gold is in veins in two flat-lying 24-ft-thick "quartzites," discordant to the prevailing foliation in biotite gneiss near a felsic intrusive. Current resources are 4.5 million oz of gold in 11 million tons of rock, grading 0.41 oz/ton (fig. D-3).

APPENDIX E

State and federal agencies and private interest groups involved in mineral development activities, 1997

(Note: The 1997 Service Directory of the Alaska Miners Association lists technical and professional consultants and companies available for work in Alaska. The report is available for \$15 from the Association's Anchorage office.)

STATE OF ALASKA AGENCIES

DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT

State Office Building, 9th Fl.
P.O. Box 110800 (mailing)
Juneau, AK 99811-0800
(907) 465-2500
(907) 465-3767 (fax)

Function: Promotes economic development in Alaska.

Division of Trade and Development

3601 C St., Ste. 700
Anchorage, AK 99503-5934
(907) 269-8110
(907) 269-8125 (fax)

State Office Building, 9th Fl.
P.O. Box 110804 (mailing)
Juneau, AK 99811-0804
(907) 465-2017

751 Old Richardson Hwy., Ste. 205
Fairbanks, AK 99701
(907) 451-3050
(907) 451-3053 (fax)

Function: Primary state government advocacy agency for economic growth. Researches and publishes economic data on Alaska's mining industry. Attracts capital investment by advertising Alaska's resource potential. Provides research staff aid for the Alaska Minerals Commission. The Division also encourages the development of new markets for Alaska resources, increases the visibility of Alaska and its products in the international marketplace, and makes referrals and provides technical assistance to those interested in developing export markets for Alaska-produced or value-added goods and services.

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795
(907) 465-5010
(907) 465-5065 Commissioner's Office
(907) 465-5060 Public Information
(907) 465-5040 TTY
(907) 465-5097 (fax)

Function: Issues permits for activities (including mining) that affect air or water quality or involve land disposal of wastes. Sets air- and water-quality

standards. Inspects, monitors, and enforces environmental quality statutes, regulations, and permits. Reviews all federal permits.

Alaska Dept. of Environmental Conservation

Anchorage Office
555 Cordova St.
Anchorage, AK 99501-2617
(907) 269-7500
(907) 269-7511 TTY
Permits/Compliance Assistance
1-800-510-2332 (inside Alaska only)
1-800-269-7586 (outside Alaska)
(907) 269-7652 (fax)
e-mail: compass@envircon.state.ak.us

Alaska Dept. of Environmental Conservation

Fairbanks Office
610 University Ave.
Fairbanks, AK 99709-3643
(907) 451-2360
(907) 451-2184 TTY
(907) 451-2188 (fax)

DEPARTMENT OF FISH AND GAME

1255 W. 8th St.
P.O. Box 25526 (mailing)
Juneau, AK 99802-5526
(907) 465-4100

Habitat and Restoration Division
(907) 465-4105

Function: Protects habitat in fish-bearing fresh waters and manages refuges, sanctuaries, and critical habitats. Requires permits for any work involving: the blockage of fish passage; equipment crossings or operation in fresh waters used by anadromous fish; use, diversion, or pollution of streams containing anadromous fish; construction, exploration, or development work in state game refuges, game sanctuaries, and critical habitat areas.

Northern Regional Office
Habitat and Restoration Division
1300 College Rd.
Fairbanks, AK 99701-1599
(907) 459-7289

Southcentral Regional Office
Habitat and Restoration Division
333 Raspberry Rd.
Anchorage, AK 99518-1599
(907) 267-2285

Southeastern Regional Office
Habitat and Restoration Division
802 3rd St., 2nd Fl.
P.O. Box 240020 (mailing)
Douglas, AK 99824-0020
(907) 465-4290

OFFICE OF MANAGEMENT AND BUDGET

Division of Governmental Coordination
240 Main St., Ste. 500
P.O. Box 110030 (mailing)
Juneau, AK 99811-0030
(907) 465-3562

Function: Conducts coordinated State review of permits for mining projects within Alaska's Coastal Management Zone. Provides project design information to applicants for consistency with the policies and standards of the Alaska Coastal Management Program. Coordinates State response to direct federal actions, including proposed regulations, that affect Alaska's mining industry.

Southcentral Regional Office
Frontier Bldg.
3601 C St., Ste. 370
Anchorage, AK 99503-5930
(907) 561-6131
(907) 561-6134 (fax)

DEPARTMENT OF NATURAL RESOURCES

400 Willoughby Ave., 5th Fl.
Juneau, AK 99801-1724
(907) 465-2400
<http://www.dnr.state.ak.us>

Division of Forestry
Frontier Bldg.
3601 C St., Ste. 1034
Anchorage, AK 99503-5937
(907) 269-8463

Function: Establishes guidelines to manage mining in state forests.

Interior Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2660

Coastal Regional Office
400 Willoughby Ave., 3rd Fl.
Juneau, AK 99801-1724
(907) 465-2491

Division of Geological & Geophysical Surveys
 794 University Ave., Ste. 200
 Fairbanks, AK 99709-3645
 (907) 451-5000
 (907) 451-5050 (fax)
 e-mail: dggs@dnr.state.ak.us
<http://www.dggs.dnr.state.ak.us>

Function: Conducts geological and geophysical surveys to determine the potential of Alaska land for production of metals, minerals, fuels, and geothermal resources; locations and supplies of construction materials; potential geologic hazards to buildings, roads, bridges, and other installations and structures; and other surveys and investigations as will advance knowledge of the geology of Alaska and general geologic inventories. Publishes a variety of reports that contain the results of these investigations. Advises the public and government agencies on geologic issues. Maintains a library of geologic bulletins, reports, and periodicals. Maintains a drill-core storage facility at Eagle River.

Geologic Materials Center
 P.O. Box 772805
 Eagle River, AK 99577-2805
 (907) 696-0079
 (907) 696-0078 (fax)

Division of Land
 3601 C St., Ste. 1122, Frontier Bldg.
 Anchorage, AK 99503-5947
 (907) 269-8503
 (907) 269-8904 (fax)

Function: Manages surface estate and resources, including materials (gravel, sand, and rock). Handles statewide and regional land-use planning. Issues leases, material-sale contracts, mill-site leases, land-use permits, and easements for temporary use of State land and access roads.

Northern Regional Office
 3700 Airport Way
 Fairbanks, AK 99709-4699
 (907) 451-2700
 (907) 451-2751 (fax)

Southcentral Regional Office
 3601 C St., Ste. 1080, Frontier Bldg.
 Anchorage, AK 99503-5937
 (907) 269-8552
 (907) 269-8913 (fax)

Southeastern Regional Office
 400 Willoughby Ave., 4th Fl.
 Juneau, AK 99801-1724
 (907) 465-3400
 (907) 586-2954 (fax)

Division of Mining & Water Management
 Frontier Bldg.
 3601 C St., Ste. 800
 Anchorage, AK 99503-5935
 (907) 269-8600
http://www.dnr.state.ak.us/mine_wat/

A. Mining

Function: Principal agency for management of mining and reclamation on state land in Alaska. Maintains a mining office in Fairbanks. Issues property rights to leasable minerals; adjudicates locatable mineral filings. Issues permits for hard-rock and placer-mining activity. Maintains records of mineral locations, permits, and leases. Provides technical, legal, and land-status information. Administers the Alaska Surface Mining Control and Reclamation Act (ASMACRA), which includes permitting and inspection of coal mining activity and reclamation of abandoned mines.

B. Water Management

Function: Manages water resources of the state; issues water-appropriation permits and certificates; responsible for safety of all dams in Alaska; conducts surveys to determine the locations, quantity, and quality of ground and surface water.

Northern Regional Office
 3700 Airport Way
 Fairbanks, AK 99709-4699
 (907) 451-2790 (Mining)
 (907) 451-2772 (Water)

Southeastern Regional Office
 400 Willoughby, 4th Fl.
 Juneau, AK 99801
 (907) 465-3400

Division of Parks and Outdoor Recreation

3601 C St., Ste. 1200
 Frontier Bldg.
 Anchorage, AK 99503-5921
 (907) 269-8700

Function: Manages approximately 3,000,000 acres of state park lands primarily for recreational uses, preservation of scenic values, and watershed. Responsible for overseeing mining access, recreational mining activity, and valid mining-claim holdings within state park lands. The Office of History and Archaeology reviews mining permit applications on all lands within the state for impacts to historic resources.

Northern Regional Office
 3700 Airport Way
 Fairbanks, AK 99709-4699
 (907) 451-2695

Southeastern Regional Office
 400 Willoughby Ave., 4th Fl.
 Juneau, AK 99801-1724
 (907) 465-4563

Office of History and Archaeology
 Frontier Bldg.
 3601 C St., Ste. 1278
 Anchorage, AK 99503-5921
 (907) 269-8721
 e-mail: michelej@dnr.state.ak.us

DEPARTMENT OF PUBLIC SAFETY
 450 Whittier St.
 P.O. Box 111200 (mailing)
 Juneau, AK 99811-1200
 (907) 465-4322

Division of Fish and Wildlife Protection
 5700 East Tudor Rd.
 Anchorage, AK 99507-1225
 (907) 269-5509

Function: Enforces state laws, in particular AS Title 16. Protects Alaska's fish and wildlife resources through enforcement of laws and regulations governing use of natural resources within Alaska. These laws are in Alaska Statutes 8, 16, 46, and Alaska Administrative Codes 5, 12, and 20.

DEPARTMENT OF REVENUE
 State Office Bldg.
 11th Fl., Entrance A
 P.O. Box 110400 (mailing)
 Juneau, AK 99811-0400
 (907) 465-2300
<http://www.revenue.state.ak.us>

Income and Excise Audit Division
 State Office Bldg.
 11th Fl., Entrance B
 P.O. Box 110420 (mailing)
 Juneau, AK 99811-0420
 (907) 465-2320
 (907) 465-2375 (fax)
 e-mail: fish_excise@revenue.state.ak.us
<http://www.revenue.state.ak.us/iea/>

Function: Issues licenses for mining, production, and sale of minerals. Administers mining-license tax based on net income, including royalties. New mining operations—except sand and gravel mining—can apply for and receive certificates of tax exemption for the first 3½ years of operation. (Tax returns must be filed annually.)

UNIVERSITY OF ALASKA**College of Science, Engineering, and Mathematics**

Department of Geology & Geophysics
308 Natural Sciences Bldg.
900 Yukon Dr.
University of Alaska Fairbanks
Fairbanks, AK 99775-5780
(907) 474-7565
(907) 474-5163 (fax)
e-mail: geology@zorba.uafadm.alaska.edu
<http://www.uaf.edu/geology>

Function: Provides undergraduate and graduate education in geology and geophysics and conducts basic and applied research in geologic sciences. Offers B.S., M.S., and Ph.D. program options in general geology, economic geology, petroleum geology, geophysics, and ice-snow-permafrost geophysics.

School of Mineral Engineering

PO Box 755960
Brooks Building - Rm. 209
University of Alaska Fairbanks
Fairbanks, AK 99775-5960
(907) 474-7366
(907) 474-6994 (fax)
e-mail: FYSME@uaf.edu
<http://www.uaf.edu>

Function: Provides undergraduate and graduate education programs in geological engineering, mining engineering, mineral preparation engineering, and petroleum engineering. Through research programs conducts laboratory and field studies to promote mineral and energy development.

Mineral Industry Research Laboratory (MIRL)

School of Mineral Engineering
O'Neill Resources Bldg., Rm. 212B
University of Alaska Fairbanks
Fairbanks, AK 99775-7240
(907) 474-7135
(907) 474-5400 (fax)

Function: Conducts applied and basic research in exploration, development, and utilization of Alaska's mineral and coal resources with emphasis on coal characterization, coal utilization, coal upgrading, coal preparation, mineral beneficiation, fine gold recovery, hydrometallurgy, and environmental concerns. Publishes reports on research results and provides general information and assistance to the mineral industry.

Mining Extension Program

Duckering Bldg., Rm. 401
University of Alaska Fairbanks
Fairbanks, AK 99775-5800
(907) 474-7702

Function: Offers prospecting and introductory mineral and mining courses under an open admissions policy.

Mining and Petroleum Training Service

155 Smiths Way, Ste. 101
University of Alaska Anchorage
Soldotna, AK 99669
(907) 262-2788

Function: Provides direct training and assistance to mine operators, service and support companies, and governmental agencies in mine safety and health, mining extension, vocational mine training, and technical transfer. Specialized training services in hazardous materials, first aid and CPR, industrial hygiene, and professional safety education and consulting are available on demand.

FEDERAL AGENCIES**U.S. DEPARTMENT OF THE INTERIOR**

Office of the Secretary
1689 C St., Ste. 100
Anchorage, AK 99501-5151
(907) 271-5485
(907) 271-4102

Function: Coordinates the Department of the Interior's policy and stewardship with DOI bureaus for the management of over 200 million acres of public land in Alaska.

Bureau of Land Management

Alaska State Office
Division of Lands, Minerals, and Resources
222 West 7th Ave., #13
Anchorage, AK 99513-7599
(907) 271-5477
Lands & Minerals Group
(907) 271-5049
Public Land Information Center
(907) 271-5960
Anchorage Mineral Resources Team
(907) 271-2454
<http://www.ak.blm.gov/>

Function: Surface manager of federal public lands (except national parks, wildlife refuges, national monuments, national forests, and military withdrawals). Performs a variety of land administration functions for federal lands. Responsible for many minerals functions on federal lands, including issuing leases for all federal leasable minerals including oil and gas, coal, phosphates, and oil shale. Arranges for sale of minerals other than leasable or materials, such as sand, gravel, or stone. Issues rights-of-way and special use

permits. Monitors mining operations to ensure protection of surface resources. Maintains land status plats and issues patents. Records federal mining claims and annual assessment affidavits, and collects annual claim holding fees.

The Anchorage and Juneau Mineral Resources Teams conduct studies that aid environmentally sound development of a viable mineral industry in Alaska. Emphasis is on field programs that identify the type, amount, and distribution of mineral deposits in Alaska. The field information is augmented by studies of beneficiation technologies, economic feasibility, and economic and environmental effects of mineral development. Information is provided to government agencies to aid land-planning and land-use decisions, and to the private sector to identify targets of opportunity for further exploration and/or development.

Anchorage Field Office
6881 Abbott Loop Rd.
Anchorage, AK 99507-2599
(907) 267-1246
(907) 267-1267 (fax)

Glennallen Field Office
PO Box 147
Glennallen, AK 99588
(907) 822-3217
(907) 822-3120 (fax)

Juneau Mineral Information Center

Juneau Mineral Resources Team
100 Savikko Rd.
Mayflower Island
Juneau, AK 99824
(907) 364-1553
(907) 364-1574 (fax)

Function: Built around the former U.S. Bureau of Mines library, the Center contains more than 20,000 geologic and minerals publications, provides a variety of on-line land status and mineral information services, and distributes many federal and state publications.

Kotzebue Field Office
PO Box 1049
Kotzebue, AK 99752-1049
(907) 442-3430
(907) 442-2720 (fax)

Nome Field Office
PO Box 925
Nome, AK 99762-0925
(907) 443-2177
(907) 443-3611 (fax)

Northern Field Office
1150 University Ave.
Fairbanks, AK 99709-3899

(907) 474-2300
 (907) 474-2251 Public Lands
 Information Center

U.S. Fish and Wildlife Service
 Region 7 Office
 1011 East Tudor Rd.
 Anchorage, AK 99503
 (907) 786-3542

Function: Administers the federal public lands in national wildlife refuges, issues special-use permits for activities on refuges, reviews permits and applications for various mining activities on all private and public lands and waters, and provides information to regulatory agencies on fish and wildlife and their habitat. Makes recommendations to regulatory agencies to mitigate adverse environmental impacts.

U.S. Fish and Wildlife Service
 Northern Alaska Ecological Services
 101 12th Ave., Rm. 110
 Box No. 19
 Fairbanks, AK 99701
 (907) 456-0327
 (907) 456-0208 (fax)

U.S. Fish and Wildlife Service
 Southeast Alaska Ecological Services
 3000 Vintage Blvd., Ste. 201
 Juneau, AK 99801-7100
 (907) 586-7240
 (907) 586-7154 (fax)

U.S. Fish and Wildlife Service
 Western Alaska Ecological Services
 605 West 4th Ave., Rm. G-62
 Anchorage, AK 99501
 (907) 271-2888
 (907) 271-2786 (fax)

U.S. Geological Survey
 Geological Division
 4200 University Dr.
 Anchorage, AK 99508-4663
 (907) 561-1181

Function: Investigates and reports on the occurrence, quality, quantity, and environmental characteristics of mineral resources, the processes that create and modify them, models for assessing mineral endowment, and the potential impacts of mineral development. A major aspect of this research involves 1:250,000-scale geologic mapping.

Water Resources Division
 4230 University Dr., Ste. 201
 Anchorage, AK 99508-4664
 (907) 786-7100

U.S. Geological Survey Earth Science
 Information Center
 National Mapping Division
 4230 University Dr., Ste. 101
 Anchorage, AK 99508-4664
 (907) 786-7011

Function: Publishes and distributes all available topographic maps of Alaska, digital products, and aerial photography.

National Park Service
 Alaska Regional Office
 2525 Gambell St.
 Anchorage, AK 99503-2892
 (907) 257-2626

Function: Administers lands within the national park system in Alaska. Manages oil and gas operations and pre-existing valid mining claims in parklands through plans of operation under Mining in Parks Act, National Park Service regulations, and other applicable federal and state laws and regulations.

U.S. DEPARTMENT OF LABOR
Mine Safety and Health
Administration
 205 N. 4th St.
 Coeur d'Alene, ID 83814-2877
 (208) 667-6680
 (208) 765-3099 (fax)

Juneau Field Station
 NOTE: THIS OFFICE WILL BE MOVING TO
 ANCHORAGE. PLEASE CALL THE COEUR
 D'ALENE OFFICE FOR INFORMATION

Function: Administers health and safety standards to protect the health and safety of metal, nonmetal, and coal miners. Cooperates with the State to develop health and safety programs and develops training programs to help prevent mine accidents and occupationally caused diseases. Under agreement with the Coal Mine Safety and Health Office, the MSHA metal/nonmetal section has assumed responsibility for enforcement and training activities at coal mines in Alaska.

Mine Safety and Health Administration
 Coal Mine Safety and Health, District 9
 P.O. Box 25367
 Denver, CO 80225
 (303) 231-5458
 (303) 231-5553 (fax)

Function: Administers health and safety standards according to the Code of Federal Regulations to protect the health and safety of coal miners; requires that each operator of a coal

mine comply with these standards. Cooperates with the State to develop health and safety programs and develops training programs to help prevent coal or other mine accidents and occupationally caused diseases in the industry.

**U.S. DEPARTMENT OF
 AGRICULTURE**
Forest Service

Regional Office, Federal Bldg.
 P.O. Box 21628
 Juneau, AK 99802-1628
 (907) 586-7869
 (907) 586-7843 (fax)
 e-mail: jkat/r10@fs.fed.us
 http://www.fs.fed.us/
 http://www.fs.fed.us/r10/

Function: With the Bureau of Land Management, provides joint administration of general mining laws on national forest system lands. Cooperates with Department of Interior agencies in the review and issuance of mineral leases. Issues permits for disposal of sand, gravel, and stone.

**U.S. ENVIRONMENTAL
 PROTECTION AGENCY**

Region 10 Regional Office
 1200 6th Ave., MS OW-130
 Seattle, WA 98101
 (206) 553-1746

Function: Issues National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act to regulate effluent discharges. Implements a compliance enforcement program. Maintains regulatory and review authority over wetland and NEPA/EIS-related issues.

Alaska Operations Office
 222 West 7th Ave., Ste. 19
 Anchorage, AK 99513-7588
 (907) 271-5083

Alaska Operations Office
 410 Willoughby Ave., Ste. 100
 Juneau, AK 99801
 (907) 586-7619

U.S. DEPARTMENT OF THE ARMY
Corps of Engineers

Regulatory Branch
 Attention: CEPOA-CO-R
 P.O. Box 898
 Anchorage, AK 99506-0898
 (907) 753-2712 or
 (800) 478-2712 (in Alaska only)
 (907) 753-2716 (fax)

Function: Regulates structures or work in navigable waters of the U.S. and discharge of dredged or fill

material into U.S. waters, including wetlands. Examples of regulated mining activities include construction of berms, dikes, diversions, ponds, overburden stripping, stockpiling, and reclamation activities.

COOPERATIVE STATE-FEDERAL AGENCIES

Alaska Public Lands Information Center
250 Cushman St., Ste. 1A
Fairbanks, AK 99701
(907) 456-0527
(907) 456-0514 (fax)
(907) 456-0532 (TDD for hearing impaired)

Function: Clearinghouse for general information on outdoor recreation in Alaska. Information sources include U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, U.S. Geological Survey, National Park Service, Alaska Departments of Natural Resources and Fish and Game, and Alaska Division of Tourism.

BOARDS AND COMMISSIONS

Alaska Minerals Commission
Irene Anderson, Chair
c/o Sitnasuak Native Corp.
PO Box 905
Nome, AK 99762
(907) 443-2632
(907) 443-3063 (fax)
email: ianderson@snc.org

Function: The Minerals Commission was created by the Alaska State Legislature in 1986 to make recommendations to the Governor and the Legislature on ways to mitigate constraints on the development of minerals in Alaska. The Commission has published annual reports since 1987.

Citizens' Advisory Commission on Federal Areas
3700 Airport Way
Fairbanks, AK 99709
(907) 451-2775

Function: The Citizens' Advisory Commission on Federal Areas was established in 1981 by the Alaska Legislature to protect the rights of Alaskans to continue their traditional uses of federal lands throughout the state. This was done in response to Congressional enactment in December 1980 of the Alaska National Interest Lands Conservation Act (ANILCA),

which placed millions of acres of federally owned lands into conservation system units with restrictive land-use and management requirements.

Alaska Science & Technology Foundation

Suite 515
4500 Diplomacy Dr.
Anchorage, AK 99508
(907) 272-4333
e-mail: bchaney@astf.org
http://www.astf.org

Function: The Foundation was created to make public funds available for long-term investment in economic development and technological innovation within the state and to improve the health status of its residents. Through the awarding of grants for basic and applied research and development, the Foundation will enhance the state's economy and help build its science and engineering capabilities.

CHAMBERS OF COMMERCE

Alaska State Chamber of Commerce
Suite 201
217 Second St.
Juneau, AK 99801
(907) 586-2323
(907) 463-5515 (fax)

Function: The State Chamber of Commerce researches and formulates positions on Alaskan resource development. Recommendations for consideration are submitted to the State Chamber of Commerce board of directors.

Juneau Chamber of Commerce
8800 Glacier Hwy., Suite 112
Juneau, AK 99801
(907) 790-4602
e-mail: jchcomm@ptialaska.net
http://www.ptialaska.net/~juneaucc

Greater Fairbanks Chamber of Commerce

250 Cushman St., Ste. 2D
Fairbanks, AK 99701-4665
(907) 452-1105
(907) 456-6968
e-mail: cocstaff@mosquitonet.com
http://www.fairbankschamber.org

Anchorage Chamber of Commerce
441 West 5th Ave., Ste. 300
Anchorage, AK 99501
(907) 272-2401
e-mail: info@anchoragechamber.org
http://www.anchoragechamber.org

PUBLIC INTEREST GROUPS AND ASSOCIATIONS

Alaska Clean Water Alliance
P.O. Box 1441
Haines, AK 99827
(907) 766-2296
(907) 766-2290 (fax)

Alaska Miners Association Inc.
Statewide Office
3305 Arctic Blvd., Suite 202
Anchorage, AK 99503
(907) 563-9229
(907) 563-9225 (fax)

Denali Branch of AMA
P.O. Box 1000
Healy, AK 99743
(907) 683-2226, ext. 719

Fairbanks Branch of AMA
P.O. Box 73069
Fairbanks, AK 99707
(888) 474-2081

Juneau Branch of AMA
P.O. Box 21684
Juneau, AK 99802-1684
(907) 586-4704
(907) 463-5712

Kenai Branch of AMA
P.O. Box 242
Sterling, AK 99672
(907) 262-6383

Nome Branch of AMA
P.O. Box 1974
Nome, AK 99762
(907) 443-2632

Alaska Women in Mining
Fairbanks Branch
P.O. Box 83542
Fairbanks, AK 99708
(907) 479-9750

Juneau Branch
P.O. Box 34044
Juneau, AK 99804
(907) 586-4161

Anchorage Branch
P.O. Box 240334
Anchorage, AK 99524
(907) 276-6762

Alaskans for Juneau
P.O. Box 22428
Juneau, AK 99802-2428
(907) 463-5065

American Institute of Professional Geologists
7828 Vance Dr., Ste. 103

Arvada, CO 80003
 (303) 431-0831
 (303) 431-1332 (fax)
 e-mail: aipg@aipg.com

Alaska Section
 2250 Woodworth Circle
 Anchorage, AK 99517
 (907) 258-9059

National Wildlife Federation
 750 W. Second Ave., Ste. 200
 Anchorage, AK 99501
 (907) 258-4800
 (907) 258-4811 (fax)

Northern Alaska Environmental Center
 218 Driveway St.
 Fairbanks, AK 99701-2895
 (907) 452-5021
 (907) 452-3100
 e-mail: naec@mosquitonet.com

Northwest Mining Association
 10 North Post St., Ste. 414
 Spokane, WA 99201
 (509) 624-1158
 (509) 623-1241 (fax)
 e-mail: nwma@nwma.org
 http://www.nwma.org

Placer Miners of Alaska
 P.O. Box 81110
 Fairbanks, AK 99708
 (907) 479-3100

**Resource Development
Council for Alaska, Inc.**
 121 W. Fireweed Ln., Ste. 250
 Anchorage, AK 99503
 (907) 276-0700
 (907) 276-3887 (fax)
 e-mail: Resources@akrdc.org

Sierra Club Legal Defense Fund
 325 Fourth St.
 Juneau, AK 99801
 (907) 586-2751
 (907) 463-5891 (fax)
 e-mail: SCCLDFAK@IGC.APC.ORG

Sierra Club Legal Defense Fund
 11 East Main St., Ste. C
 Bozeman, MT 59715
 (406) 586-9699
 (406) 586-9695 (fax)

**Society for Mining, Metallurgy, and
Exploration Inc.**
 P.O. Box 625002
 Littleton, CO 80162-5002
 (303) 973-9550
 (303) 973-3845 (fax)

Secretary Treasurer-John Rishel
 1505 Atkinson Dr.
 Anchorage, AK 99504
 (907) 337-0511

**Southeast Alaska Conservation Council
(SEACC)**
 419 6th St., Ste. 328
 Juneau, AK 99801
 (907) 586-6942
 (907) 463-3312 (fax)
 e-mail: info@seacc.org
 http://www.juneau.com/seacc/

Trustees for Alaska
 725 Christensen Dr., Ste. 4
 Anchorage, AK 99501
 (907) 276-4244
 e-mail: ecolaw@trustees.org

ORGANIZED MINING DISTRICTS

Circle Mining District
 P.O. Box 80674
 Fairbanks, AK 99708
 (907) 488-6058

Fairbanks Mining District
 105 Dunbar
 Fairbanks, AK 99701
 (907) 456-7642

Fortymile Miners Association
 P.O. Box 3885
 Palmer, AK 99645
 (907) 746-4404

Haines Mining District
 P.O. Box 149
 Haines, AK 99827
 (907) 766-2228

Iditarod Mining District
 John A. Miscovich
 General Delivery
 Flat, AK 99584

Juneau Mining District
 P.O. Box 20765
 Juneau, AK 99802
 (907) 789-4065

Kantishna Mining District
 P.O. Box 84608
 Fairbanks, AK 99708

Koyukuk Mining District
 P.O. Box 9066
 Coldfoot, AK 99701

Livengood-Tolovana Mining District
 P.O. Box 55698
 North Pole, AK 99705
 (907) 488-6453

Valdez Creek Mining District
 P.O. Box 875534
 Wasilla, AK 99687-5534

Ventna Mining District
 13004 NE 9th Ave.
 Vancouver, WA 98685

MINERAL EDUCATION PROGRAMS

ALASKA MINERAL AND ENERGY RESOURCE EDUCATION FUND (AMEREF)
 c/o RDC
 121 W. Fireweed Ln., Ste. 250
 Anchorage, AK 99503
 (907) 276-0070
 (907) 276-3887 (fax)

Function: A nonprofit corporation formed to help prepare students in grades K-12 to make informed decisions about Alaska's mineral and energy resources.

Alaska Department of Education
 801 W. 10th St., Ste. 200
 Juneau, AK 99801-1894
 (907) 465-2826

NATIVE REGIONAL CORPORATIONS

AHTNA INCORPORATED
 Main Office
 P.O. Box 649
 Glennallen, AK 99588-0649
 (907) 822-3476
 (907) 822-3495 (fax)

Anchorage Office
 406 Fireweed Ln., Ste. 204
 Anchorage, AK 99503-2649
 (907) 274-7662
 (907) 274-6614 (fax)

THE ALEUT CORPORATION
 4000 Old Seward Hwy., Ste. 300
 Anchorage, AK 99503-6087
 (907) 561-4300
 (907) 563-4328 (fax)

ARCTIC SLOPE REGIONAL CORPORATION
 P.O. Box 129
 Barrow, AK 99723-0129
 (907) 852-8633
 (907) 852-5733 (fax)

Anchorage Office
 301 Arctic Slope Ave., Ste. 300
 Anchorage, AK 99518-3035
 (907) 349-2369
 (907) 349-5476 (fax)

BERING STRAITS NATIVE CORP.
 P.O. Box 1008
 Nome, AK 99762-1008
 (907) 443-5252
 (907) 443-2985 (fax)
 e-mail: bsncland@nome.net

BRISTOL BAY NATIVE CORP.
 800 Cordova St.
 P.O. Box 100220 (mailing)

Anchorage, AK 99510-0220
(907) 278-3602
(907) 276-3924 (fax)

CALISTA CORP.
601 W. 5th Ave., Ste. 200
Anchorage, AK 99501-2226
(907) 279-5516
(907) 272-5060 (fax)

CHUGACH ALASKA CORP.
560 E. 34th Ave., Ste. 200
Anchorage, AK 99503-4196
(907) 563-8866
(907) 563-8402 (fax)

COOK INLET REGION INC.
and its subsidiary North Pacific
Mining Corporation
P.O. Box 93330
Anchorage, AK 99509-3330
(907) 274-8638
(907) 263-5183 (fax)

DOYON LTD.
201 1st Ave., Ste. 300
Fairbanks, AK 99701
(907) 459-2000
(907) 459-2060 (fax)

KONIAG INC.
4300 B St., Ste. 407
Anchorage, AK 99503
(907) 561-2668
(907) 562-5258 (fax)

NANA REGIONAL CORP.
P.O. Box 49
Kotzebue, AK 99752
(907) 442-3301
(907) 442-2866 (fax)

Anchorage Office
1001 E. Benson Blvd.
Anchorage, AK 99508
(907) 265-4100
(907) 265-4123 (fax)

SEALASKA CORP.
One Sealaska Plaza, Ste. 400
Juneau, AK 99801
(907) 586-1512
(907) 586-2304 (fax)

APPENDIX F

Primary metals production in Alaska, 1880-1997^a

Year	Gold (troy)	Gold (ms)	Silver (oz)	Silver (t\$)	Mercury (flask ^b) (t\$)	Antimony (lb) (t\$)	Tin (lb) (t\$)	Lead (tons) (t\$)	Zinc (tons) (t\$)	Platinum (oz) (t\$)	Copper (lb) (ms\$)	Chromium (tons) (t\$)	
1880- 1899	1,153,889	23,85	496,101	329,0	—	—	—	250	17,0	—	—	—	
1900	395,030	8,17	73,300	45,5	—	—	—	40	3,4	—	—	—	
1901	335,369	6,93	47,900	28,6	—	—	—	40	3,4	—	250,000	0.04	
1902	400,709	8,28	92,000	48,5	—	—	—	30,000	8,0	30	2,5	360,000	
1903	420,069	8,68	143,600	77,8	—	—	—	50,000	14,0	30	2,5	1,200,000	
1904	248,115	9,16	198,700	114,9	—	—	—	28,000	8,0	30	2,5	2,043,586	
1905	756,101	15,63	132,174	80,2	—	—	—	12,000	4,0	30	2,6	4,805,236	
1906	1,066,030	22,04	203,500	136,4	—	—	—	68,000	38,6	30	3,4	756,101	
1907	930,643	19,35	149,784	98,8	—	—	—	44,000	16,8	30	3,2	5,871,811	
1908	933,290	19,29	135,672	71,9	—	—	—	50,000	15,2	40	3,4	6,308,786	
1909	987,417	20,41	147,950	76,9	—	—	—	22,000	7,6	69	5,9	4,585,362	
1910	780,131	16,13	157,850	85,2	—	—	—	20,000	8,3	75	6,6	6,124,705	
1911	815,776	16,85	460,231	243,9	—	—	—	122,000	52,8	51	4,5	4,241,689	
1912	829,436	17,14	515,186	316,8	—	—	—	260,000	119,6	45	4,1	27,267,778	
1913	755,947	15,63	362,563	218,9	—	—	—	100,000 ^c	44,1 ^c	6	0,6	29,230,491	
1914	762,296	15,76	394,905	218,3	—	—	—	208,000	66,6	28	1,3	21,659,958	
1915	807,166	16,29	1,071,782	543,3	—	—	—	520,000	W	78,8	43,7	21,450,628	
1916	834,668	17,24	1,379,171	907,4	—	—	—	1,200,000	W	204,000	41,1	86,509,312	
1917	700,049	14,66	1,239,150	1,020,6	—	—	—	200,000	W	278,000	113,2	8,15	
1918	458,641	9,48	847,789	847,8	—	—	—	500,000	W	200,000	85,2	5,5	
1919	455,984	9,42	629,708	705,3	—	—	—	540,000	W	136,000	118,0	88,700	
1920	40,683	8,37	953,546	1,039,7	—	—	—	—	—	12,000	73,4	11,100	
1921	390,558	8,07	761,085	761,1	45	1,5	—	—	32,000	16,1	875	140,0	1,100
1922	3,594,057	7,42	729,945	729,9	—	—	—	—	—	121,0	820	118,0	
1923	289,339	5,98	814,649	668,1	—	—	—	—	—	3,800	1,0,9	29,230,491	
1924	304,072	6,29	669,641	448,6	0,3	—	—	—	14,000	7,1	631	100,9	
1925	307,679	6,36	698,259	482,4	44	3,6	—	—	28,600	15,4	789	140,6	
1926	324,450	6,70	605,190	377,0	22	1,7	W	W	W	16,0	778	124,4	
1927	286,720	5,97	350,430	215,0	—	—	—	—	53,400	34,0	1,008	127,0	
1928	331,140	6,85	351,730	187,0	—	—	—	—	82,000	2,4	759	68,3	
1929	3,753,338	7,76	472,900	252,0	4	0,5	—	—	77,200	35,0	377	41,421,000	
1930	408,983	8,47	408,570	157,3	—	—	—	—	29,400	9,3	1,315	10,50	
1931	459,000	9,51	352,000	102,0	15	1,2	—	—	—	166,0	136,5	5,5	
1932	493,360	10,20	234,050	66,0	8	0,5	—	—	—	1,660	126,0	393	
1933	468,286	9,70	154,700	55,0	—	—	—	—	—	1,260	75,6	—	
1934	537,281	8,78	154,700	100,0	—	—	—	—	—	—	8,738,500	5,5	
1935	468,495	16,43	286,600	206,0	—	—	—	—	—	—	605	18,6	
1936	540,380	18,92	484,306	375,0	—	—	—	—	—	—	2,555	85,6	
1937	622,940	21,98	494,340	382,0	—	—	—	—	—	—	8,685	259,6	
1938	662,000	23,17	479,853	310,0	8	0,6	444,000	54,8	210,000	89,1	994	7,654	
1939	676,780	23,68	201,054	136,5	—	—	—	—	366,000	38,0	937	33,900	
1940	755,200	26,45	191,679	136,3	156 ^c	130,9	306,000	42,8	92,000	52,0	840	2,034,000	
1941	692,314	24,23	199,700	142,0	W	W	774,000	87,3	93,600 ^c	61,0 ^c	741,000	121,000	
1942	482,657	17,07	135,200	96,0	W	W	316,000	41,0	5,600	21,5	741,000		
1943	99,983	3,49	31,700	22,0	—	—	962,000	147 ^c	372,000 ^c	202,3 ^c	823	3,72	
1944	49,296	1,73	15,240	10,8	841	16,5	—	—	—	—	41,000	29,760,000	
1945	68,117	2,38	9,983	6,2	—	—	—	—	—	—	—	5,564	
1946	226,781	7,93	41,793	26,3	68,7	—	—	—	—	—	—	186,3	
1947	66,150	46,3	127	10,6	52,000	2,000	—	—	—	—	4,000	64,6	
1948	248,395	67,341	58,7	10,8	88,000	29,3	10,08	—	—	—	—	—	
1949	279,416	8,03	32,4	10,2	79	88,000	31,3	114,000	100,8	49	11,2	—	

APPENDIX F
continued

Year	Gold (oz)	Gold (m\$)	Silver (oz)	Silver (m\$)	Mercury (lb)	Mercury (t\$)	Antimony (lb)	Antimony (t\$)	Tin (lb)	Tin (t\$)	Lead (tons)	Lead (t\$)	Platinum (oz)	Platinum (t\$)	Copper (lb)	Copper (m\$)	Chromium (t\$)			
1950	289,285	10,13	52,638	48,0	W	W	1,718,000	2,061,6	158,000	170,3	144	27,5	—	—	12,000	0,03	—			
1951	239,628	8,38	32,870	29,8	28	W	180,000	198,0	21	7,2	—	—	W	W	W	W				
1952	240,571	8,42	31,825	28,7	40	W	740,000	1,406,0	243,9	1	0,3	—	—	W	W	W	W			
1953	253,771	8,88	35,387	32,1	1,023	270,0	W	98,000	105,9	—	—	—	—	17,489	1,696,4	—	—			
1954	248,511	8,70	33,694	31,8	1,046	276,0	—	398,000	409,9	—	—	—	—	18,790	1,615,9	8,000	0,02			
1955	249,294	8,73	33,693	30,4	43	12,0	—	172,000	182,5	1	0,3	—	—	17,253	1,466,5	2,000	0,01			
1956	204,300	7,33	26,700	24,1	3,414	134,340	150,0	—	—	1	0,3	—	—	17,934	1,529,3	7,200	711,5			
1957	215,467	7,54	28,862	26,0	5,461	1,349,0	71,120	80,0	—	9	3,0	—	—	15,479	1,377,6	—	4,207			
1958	186,000	6,53	24,000	22,0	3,380	774,0	—	—	—	—	—	—	10,284	647,9	10,000	0,03	—			
1959	171,000	5,99	22,000	20,0	852,0	—	—	—	—	—	—	—	10,698	770,3	22,000	0,04	—			
1960	180,000	6,30	23,000	21,0	4,450	9,38,0	W	W	—	—	—	—	13,352	1,054,8	82,000	0,04	—			
1961	114,228	3,99	—	—	4,080	816,0	—	—	—	—	—	—	16,133	1,274,5	184,000	0,06	—			
1962	165,142	5,78	—	—	3,843	711,0	—	—	—	—	—	—	12,520	951,5	—	—	—			
1963	99,000	3,48	6,100	9,0	400	76,0	W	W	—	—	5	1,1	—	—	12,322	961,1	—	—		
1964	58,000	2,05	7,200	6,0	303	95,0	46,400	60,3	—	—	—	—	13,010	1,522,2	22,000	0,01	—			
1965	43,000	1,51	5,000	6,0	180	104,0	46,400	60,3	—	—	14	4,0	—	—	10,365	1,368,2	64,000	0,03		
1966	27,325	0,96	7,000	9,0	185	101,0	—	—	16,000	192	—	—	—	—	9,033	1,273,7	—	—		
1967	22,948	0,80	6,000	9,0	161	79,0	20,000	22,0	—	—	—	—	—	—	7,888	1,238,4	W	W		
1968	21,000	0,81	3,000	6,5	156	78,0	6,000	6,0	—	—	—	—	—	—	8,433	1,652,9	—	—		
1969	21,227	0,88	2,000	4,2	2,38	100,0	94,000	100,0	—	—	2	0,5	—	—	8,500	2,321,2	—	—		
1970	38,400	1,38	4,000	7,0	3,100	1,260,0	365,000	40,0	—	—	—	—	—	—	6,015	925,1	W	W		
1971	34,000	1,36	2,000	4,0	6,75	285,0	68,000	74,0	34,000	47,0	—	—	—	—	5,407	825,6	—	—		
1972	8,639	0,56	1,000	2,0	125	44,0	160,000	185,0	W	W	—	—	—	—	—	—	—	—		
1973	15,000	1,86	13,200	22,0	70	52,5	420,000	515,0	10,000	12,0	6	2,0	—	—	5,524	964,5	—	—		
1974	16,000	2,56	1,500	3,8	70	52,5	80,000	95,0	W	W	—	—	—	—	4,351	1,067,0	—	—		
1975	14,980	3,35	6,000	25,0	—	—	120,000	145,0	22,000	60,0	—	—	—	—	3,726	623,3	—	—		
1976	22,388	6,90	6,500	24,0	—	—	160,000	165,0	W	W	14	6,0	—	—	3,212	515,2	—	—		
1977	50,000	7,80	8,000	20,0	—	—	W	W	—	—	—	—	6,891	1,119,8	—	—	—			
1978	60,000	12,00	6,000	50,0	—	—	W	W	—	—	—	—	—	—	—	—	—	—		
1979	65,000	18,00	6,500	93,0	—	—	100,000	125,0	100,000	83,0	—	—	—	—	—	—	—	—		
1980	75,000	32,00	7,500	111,0	—	—	—	—	120,000	984,0	31	—	—	—	—	900	200,0	—	—	
1981	134,200	55,20	13,420	111,3	W	W	—	—	106,000	700,0	—	—	W	W	—	—	—	—	—	
1982	175,000	69,90	22,000	198,0	—	—	—	—	198,000	1,365,0	—	—	W	W	—	—	—	—	—	
1983	169,000	67,60	33,200	33,20	—	—	22,400	45,0	215,000	1,100,0	—	—	W	W	—	—	—	—	—	
1984	175,000	62,13	26,000	15,9,0	1,5	135,000	225,8	225,8	225,000	400,0	—	—	—	—	—	—	—	—	—	
1985	190,000	61,18	28,500	171,0	27	10,0	65,000	98,0	300,000	650,0	—	—	—	—	—	—	—	—	—	
1986	160,000	60,80	24,000	134,4	12	2,8	45,000	67,5	340,000	890,0	—	—	—	—	—	—	—	—	—	
1987	229,707	104,51	54,300	39,10	—	—	—	—	288,000	460,0	—	—	—	—	—	—	—	—	—	
1988	265,500	112,84	47,790	282,0	W	W	—	—	300,000	980,0	—	—	—	—	—	—	—	—	—	
1989	284,617	108,70	5211,591	27,300,0	—	—	NR	194,000	672,0	9,588	7,700,0	19,843	29,400,0	—	—	—	—	—	—	
1990	251,700	80,20	10,135,000	50,675,0	—	—	—	—	57,000	200,0	44,220	30,954,0	181,200	253,680,0	—	—	—	—	—	
1991	243,900	88,29	6,076,854	39,110,9	—	—	—	—	6,800	22,1	69,591	33,403,7	278,221,0	15	5,3	—	—	—	—	
1992	262,830	88,46	9,115,755	34,915,0	—	—	—	—	1,500	5,9	68,664	31,585,0	274,507,7	—	—	—	—	—	—	
1993	191,265	68,64	5,658,958	24,333,0	—	—	—	—	21,000	50,6	38,221	13,759,6	268,769	3,212	—	—	—	—	—	
1994	182,100	70,29	10,685,400	10,391,0	—	—	—	—	—	—	36,447	25,512,9	329,003	206,102,7	5	—	—	—	—	—
1995	141,882	56,14	1,225,70	6,68,80	—	—	—	—	—	—	58,098	34,428,6	345,552,0	1	0,4	—	—	—	—	—
1996	161,565	62,62	3,676,000	19,078,0	—	—	—	—	—	—	70,086	52,284,0	306,780	361,646,0	2	0,8	780,000	0,80	—	—
1997	590,516	207,29	14,401,165	70,701,0	—	—	—	—	—	—	49,593,0	419,197	494,888,0	1,440,000	3,54	—	—	—	—	—
Others ^c	—	—	—	1,438	—	—	—	—	—	—	—	—	—	71,946	17,091,9	—	—	—	—	—

^aFrom published and unpublished state and federal documents.

^b76-lb flask.

^cNot traceable by year.

^dCrude platinum; total production of refined metal is about 575,000 oz.

101 V1 34,130,229 2,269,85 80,486,738 209,512,4 40,945 9,910,5 11,970,800 6,655,1 2,287,700 12,523,5 509,772 282,229,9 2,498,048 2,597,946,6 668,548,0 65,815,7 1,378,013,932 332,38 39,051 3,426,7

W = Withheld.

— = Not reported.

ts = Thousand dollars.

m\$ = Million dollars.

APPENDIX G

Production of industrial minerals, coal, and other commodities in Alaska, 1880-1997

Year	Coal		Sand and gravel		Rock ^a		Barite		Other ^b \$
	s. tons	m\$	s. tons	m\$	s. tons	m\$	s. tons	t\$	
1880-1899 ^c	19,429	0.14	—	—	7,510	0.04	—	—	—
1900	1,200 ^d	0.02 ^d	—	—	510	0.01	—	—	—
1901	1,300 ^d	0.02 ^d	—	—	700	0.01	—	—	500
1902	2,212 ^d	0.02 ^d	—	—	800	0.01	—	—	255
1903	1,447	0.01	—	—	920	0.01	—	—	389
1904	1,694	0.01	—	—	1,080	0.02	—	—	2,710
1905	3,774	0.02	—	—	970	0.02	—	—	740
1906	5,541	0.02	—	—	2,863	0.03	—	—	19,965
1907	10,139	0.05	—	—	3,899	0.03	—	—	54,512
1908	3,107 ^d	0.01 ^d	—	—	2,176	0.03	—	—	81,305
1909	2,800	0.02	—	—	1,400	0.01	—	—	86,027
1910	1,000 ^d	0.01 ^d	—	—	W	W	—	—	96,408
1911	900 ^d	0.01 ^d	—	—	W	W	—	—	145,739
1912	355 ^d	0.01 ^d	—	—	W	W	—	—	165,342
1913	2,300	0.01	—	—	W	W	—	—	286,277
1914	1,190	0.01	—	—	W	W	—	—	199,767
1915	1,400	0.03	—	—	W	W	—	—	205,061
1916	12,676	0.05	—	—	W	W	—	—	326,731
1917	54,275	0.27	—	—	W	W	—	—	203,971
1918	75,816	0.41	—	—	W	W	—	—	171,452
1919	60,894	0.35	—	—	50,014	0.29	—	—	214,040
1920	61,111	0.36	—	—	37,044	0.27	—	—	372,599
1921	76,817	0.49	—	—	59,229	0.31	—	—	235,438
1922	79,275	0.43	—	—	54,251	0.30	—	—	266,296
1923	119,826	0.76	—	—	83,586	0.41	—	—	229,486
1924	99,663	0.56	—	—	35,294	0.26	—	—	348,728
1925	82,868	0.40	—	—	32,193	0.19	—	—	454,207
1926	87,300	0.46	—	—	33,283	0.20	—	—	423,000
1927	104,300	0.55	—	—	41,424	0.22	—	—	—
1928	126,100	0.66	—	—	63,347	0.31	—	—	—
1929	100,600	0.53	—	—	54,766	0.26	—	—	194,000
1930	120,100	0.63	—	—	66,234	0.33	—	—	157,300
1931	105,900	0.56	—	—	59,175	0.29	—	—	108,000
1932	102,700	0.53	—	—	54,167	0.27	—	—	223,400
1933	96,200	0.48	—	—	56,291	0.28	—	—	—
1934	107,500	0.45	—	—	64,234	0.36	—	—	46,155
1935	119,425	0.50	—	—	74,049	0.38	—	—	46,755
1936	136,593	0.57	—	—	76,379	0.38	—	—	45,807
1937	131,600	0.55	—	—	50,057	0.25	—	—	147,048
1938	159,230	0.62	—	—	189,090	0.21	—	—	125,302
1939	143,549	0.60	42,332	0.02	—	—	—	—	—
1940	170,174	0.88	515,011	0.10	—	—	—	—	—
1941	241,250	0.97	530,997	0.09	—	—	—	—	1,367,000
1942	246,600	0.99	W	W	—	—	—	—	1,124,000
1943	289,232	1.84	W	W	—	—	—	—	—
1944	352,000	2.37	712,496	0.50	—	—	—	—	2,350,309
1945	297,644	1.87	W	W	—	—	—	—	5,910,704
1946	368,000	2.36	W	W	—	—	—	—	2,005,241
1947	361,220	2.55	W	W	219,000	1.00	—	—	5,927,319
1948	407,906	2.79	W	W	67,341	0.33	—	—	1,257,699
1949	455,000	3.60	W	W	W	W	—	—	7,181,886
1950	421,455	3.03	3,050,020	2.38	W	W	—	—	2,100,000
1951	494,333	3.77	6,818,000	3.54	W	W	—	—	3,600,000
1952	648,000	5.77	6,817,800	3.54	W	W	—	—	9,052,000
1953	861,471	8.45	7,689,014	5.08	47,086	0.17	—	—	1,231,350
1954	666,618	6.44	6,639,638	6.30	283,734	0.47	—	—	1,572,150
1955	639,696	5.76	9,739,214	8.24	265,740	0.29	—	—	1,552,427
1956	697,730	6.37	9,100,000	8.30	50,000	0.02	—	—	1,551,500
1957	842,338	7.30	6,096,000	8.79	528,000	1.95	—	—	2,751,000
1958	759,000	6.93	4,255,000	3.87	615,000	2.07	—	—	695,000
1959	602,000 ^d	5.88 ^d	5,600,000	5.10	54,000	0.20	—	—	1,338,000

Year	Coal		Sand and gravel		Rock ^a		Barite		Other ^b
	s. tons	m\$	s. tons	m\$	s. tons	m\$	s. tons	t\$	\$
1960	669,000 ^d	5.95 ^d	5,892,000	5.35	80,000	0.30	--	--	975,000
1961	650,000 ^d	5.87 ^d	5,241,000	4.19	--	--	--	--	--
1962	675,000 ^d	6.41 ^d	5,731,000	5.36	--	--	--	--	--
1963	853,000	5.91	16,926,000	22.01	W	W	W	W	2,589,000
1964	745,000	5.01	26,089,000	18.49	W	W	W	W	4,912,000
1965	860,000 ^d	5.88 ^d	29,959,000	33.93	W	W	W	W	5,296,000
1966	927,000	6.95	17,457,000	21.79	W	W	44,000	350.0	6,167,000
1967	930,000	7.18	22,300,000	26.25	W	W	W	W	4,924,000
1968	812,000 ^d	5.03 ^d	17,515,000	20.73	W	W	91,000	W	4,117,000
1969	728,000 ^d	4.65 ^d	16,205,000	18.62	1,954,000	3.90	90,000	850.0	5,163,000
1970	786,000 ^d	5.28 ^d	20,375,000 ^d	26.07 ^d	6,470,000	10.01	134,000 ^d	1,875.0	7,994,000
1971	748,000 ^d	5.05 ^d	26,391,000	41.99	2,658,000	5.07	102,000 ^d	1,075.0	--
1972	720,000 ^d	6.26 ^d	14,187,000	15.21	652,000	3.01	W	W	--
1973	700,000 ^d	6.23 ^d	19,350,000	19.01	5,967,000	12.00	112,000	1,792.0	12,846,000
1974	700,000	7.34	118,740,000 ^d	240.94 ^d	5,484,000	12.95	110,000	1,895.0	14,495,000
1975	766,000	7.81	48,145,000	95.78	8,877,000	26.65	2,000 ^d	30.0	12,731,000
1976	705,000	8.00	74,208,000 ^d	204.73 ^d	6,727,000	20.09	W	W	14,019,000
1977	780,000 ^d	12.00 ^d	66,126,000	134.25	4,008,000	17.47	--	--	14,486,000
1978	750,000	15.00	51,100,000	122.00	3,437,000	14.65	22,000	750.0	--
1979	750,000	16.00	50,900,000	104.90	3,650,000	15.45	20,000	800.0	930,000
1980	800,000	16.00	40,000,000	86.00	3,700,000	15.40	50,000	2,000.0	97,500
1981	800,000	17.60	46,000,000	88.20	4,200,000	19.30	--	--	256,000
1982	830,000	18.00	45,000,000	91.00	3,400,000	15.60	--	--	150,000
1983	830,000	18.00	50,000,000	105.00	5,270,000	25.00	--	--	242,000
1984	849,161	23.75	27,000,000	95.00	2,700,000	16.00	--	--	875,875
1985	1,370,000	39.73	28,184,080	112.06	2,500,000	12.00	--	--	559,000
1986	1,492,707	40.10	20,873,110	75.76	4,200,000	20.32	--	--	384,800
1987	1,508,927	42.35	16,696,374	42.66	1,805,000	11.62	--	--	388,400
1988	1,551,162	44.30	17,264,500	48.75	3,600,000	24.65	--	--	389,000
1989	1,452,353	41.46	14,418,000	39.88	2,914,000	20.34	--	--	1,492,000
1990	1,576,000	44.99	15,013,500	40.82	3,200,000	22.10	--	--	400,000
1991	1,540,000	39.00	14,160,011	45.45	3,000,000	22.50	--	--	462,000
1992	1,531,800	38.30	14,599,746	42.20	2,900,000	22.97	--	--	430,000
1993	1,586,545	38.10	13,162,402	40.64	3,561,324	26.21	--	--	465,000
1994	1,490,000	36.75	13,518,321	40.95	3,843,953	27.04	--	--	459,500
1995	1,640,000	41.30	9,847,550	30.89	2,811,152	22.13	--	--	182,500
1996	1,481,000	38.00	9,890,463	32.20	3,000,045	23.56	--	--	200,000
1997	1,446,000	43.44	13,800,000	51.91	3,200,000	20.00	--	--	25,000
Other ^d	--	--	--	--	2,300,000 ^e	W	79,000	W	--
TOTAL	51,275,428	861.09	1,129,870,579	2,346.82	115,456,310	520.78	856,000	11,417.0	177,354,872

^aBuilding-stone production figures for 1880-1937 are for the southcentral and interior regions of Alaska only.

^bIncludes 2.4 million lb U₃O₈ (1955-71); 505,000 tons gypsum (1905-26); 286,000 lb WO₃ (intermittently 1916-80); 94,000 lb asbestos (1942-44); 540,000 lb graphite (1917-18 and 1942-50); and undistributed amounts of zinc, jade, peat, clay, soapstone, miscellaneous gemstones, and other commodities (1880-1993).

^cProduction not traceable by year.

^dWhen state (territorial) and federal figures differ significantly, state figures are used. Figures for sand and gravel production in 1974 show state estimates (118,740,000 s. tons; 240.94 m\$) and federal (42,614,000 s. tons; 88.96 m\$). The federal estimate was not added to total production.

^eMarble quarried on Prince of Wales Island, southeastern Alaska (1900-41).

m\$ = Million dollars.

t\$ = Thousand dollars.

-- = Not reported.

W = Withheld.

U.S. Customary Units/Metric Units Conversion Chart

To convert from:	To:	Multiply by:
Weight/Mass		
ounces (avoirdupois)	grams	28.350
ounces (troy)	grams	31.1035
pounds	kilograms	0.4536
short tons	metric tons	0.9072
grams	ounces (avoirdupois)	0.03527
	ounces (troy)	0.03215
kilograms	pounds	2.2046
metric tons	short tons	1.1023
Length		
miles	kilometers	1.6093
yards	meters	0.9144
feet	meters	0.3048
	centimeters	30.48
	millimeters	304.80
inches	centimeters	2.54
	millimeters	25.4
kilometers	miles	0.6214
meters	yards	1.0936
	feet	3.2808
millimeters	feet	0.00328
centimeters	inches	0.03937
	inches	0.3937
Area		
square miles	square kilometers	2.590
acres	square meters	4,046.873
	hectares	0.4047
square yards	square meters	0.8361
square feet	square meters	0.0929
square inches	square centimeters	6.4516
	square millimeters	645.16
square kilometers	square miles	0.3861
square meters	acres	0.000247
	square feet	10.764
	square yards	1.196
hectares	acres	2.471
	square meters	10,000.00
square centimeters	square inches	0.155
square millimeters	square inches	0.00155
Volume		
cubic yards	cubic meters	0.7646
cubic feet	cubic meters	0.02832
cubic inches	cubic centimeter	16.3871
cubic meters	cubic yards	1.3079
	cubic feet	35.3145
cubic centimeters	cubic inches	0.06102
gallons (U.S.)	liters	3.7854
liters	gallons (U.S.)	0.2642
milliliters	ounces (fluid)	0.03381
ounces (fluid)	milliliters	29.5735

Temperature conversions:

From degrees Fahrenheit to degrees Celsius, subtract 32 and multiply by 5/9.

From degrees Celsius to degrees Fahrenheit, multiply by 9/5 and add 32.

SOURCE: *Minerals Today*, February 1993, U.S. Bureau of Mines.

